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ABSTRACT

As an alternative to the job as the unit of test validation, the project developed a system of tasks to describe work performed in clerical, administrative, and technical positions. Measures of performance in 13 of these task clusters were used as criteria to evaluate the validity of the United States Employment Service (U.S.E.S.) Basic Occupational Literacy Test (BOLT). Detailed analysis of summary statistics and scatterplots revealed a high degree of validity and fairness across sexes, whites, blacks, American Indians, and Spanish heritage persons. (Author/BJG)

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REPLACING JOBS WITH TASK CLUSTERS AS THE WORK UNIT FOR TEST VALIDATION

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As an alternative to the job as the unit of test validation, the project developed a system of tasks to describe work performed in clerical, administrative, and technical positions. Measures of performance in 13 of these task clusters were used as criteria to evaluate the validity of the U.S.E.S. Basic Occupational Literacy Test. Detailed analysis of summary statistics and scatterplots revealed a high degree of validity and fairness across sexes, Whites, Blacks, American Indians, and Spanish heritage persons.

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ABBREVIATIONS

AC	Arithmetic Computation
AR	Arithmetic Reasoning
RC	Reading Comprehension
RV	Reading Vocabulary
BOLT	Basic Occupational Literacy Test
CPM	Cluster Performance Measure

ABSTRACT

REPLACING JOBS WITH TASK CLUSTERS AS THE WORK UNIT FOR TEST VALIDATION

Brent Baxter

Statement of the Problem

The amount of research effort and cost to collect evidence that a personnel test is an efficient and fair predictor of performance on a particular job for all classes of applicants can be considerable. When this burden is extended to all the jobs for which the test might be relevant (as required by EEOC Guidelines), the cost becomes exorbitant. The present project sought an alternative, less costly approach which would still maintain high standards and job relevancy. The alternative is to predict performance on major job functions (task clusters) rather than the entire job. This approach assumes that the same basic functions appear across many jobs. The purpose of the project was to identify such functions and demonstrate their application to a validity study.

Development of a Task Structure

Using a large number of tasks from clerical/technical/administrative jobs, a basic system of task clusters was found which describes the inherent nature of the information processing being performed. Each cluster describes: 1) how the worker obtains the information which is processed; 2) what manipulations are performed and their complexity; and 3) how the worker provides some form of task output. In the most typical task the worker 1) deals with information that comes to the work setting ready for manipulation (a search for information is not necessary), 2) sorts, files or compiles the information following simple, well-defined rules, and 3) provides a standard written output.

Study Design

A demonstration study was designed to validate the ability of the U.S.E.S. Basic Occupational Literacy Test (BOLT) to predict performance on 10 basic task clusters. The task clusters selected were relatively easy and represented work frequently appearing in entry level positions. They were prototypes for representative, real-world tasks. Methods of measuring task cluster output were devised to provide criteria. These measures were demonstrated to be objective and reliable indices of performance.

The BOLT Test and measures of performance were administered by State Employment Service personnel to over 2,000 Whites, Blacks, American Indians, and Spanish background volunteers from 12 States. These groups, including a balance of males and females, had minimum English language literacy skills, They covered an age range from 16 to 69.

Separate data analysis evaluated the predictiveness of each of the four BOLT subtests (Arithmetic Computation, Arithmetic Reasoning, Reading Vocabulary, and Reading Comprehension) within each of the racial/ethnic and sex groups. The analysis also considered whether or not a single prediction equation was fair for all groups. The data review went beyond the summary statistics to an examination of the scatterplots, thus revealing in more detail the particular nature of the relationships.

Study Results

The results showed that one or more of the BOLT subtests predicted performance on all the typical tasks, and in almost every case for each of the subgroups. The Arithmetic Computation Test proved to be the most effective predictor.

The validity coefficients did not differ significantly among the racial/ethnic groups nor between the sexes. The lowest literacy Blacks, and Males, however, tended to have considerable variability and lower average scores on some task measures than the comparable Whites or Females. Thus in some cases the performance of these two groups would be overestimated by prediction based on White or Female data. From these data it is not possible to conclude why task performance is more difficult than is literacy test-taking.

Conclusions

The project has shown the feasibility of conducting validation studies on the basis of task clusters rather than innumerable, constantly changing jobs. Moreover, it is possible to develop criterion measures that are practical and more predictable than supervisory impressions. Such measures for the more complex task clusters, however, will be more difficult in both construction and administration.

A job analysis form is proposed to identify the task clusters which appear as an important part of any job. Wherever a cluster is found to be a significant part of a job, the relevant BOLT subtest(s) may be used in selection.

It is recommended that the system of task clusters be extended to higher level tasks and to jobs dealing with people and things.

INTRODUCTION

The initial concept of the validity of a test centered in the question: does the test measure what it is designed to measure. Thus the research person sought evidence to substantiate that the test really measured clerical aptitude or aggressiveness, or whatever the test was claimed to measure. Validity was regarded as a self-contained characteristic of the test (along with reliability). But in recent years the focus has shifted to the much more specific question: do the test scores correlate with some significant external measure in a given situation for a particular group of people. A test is no longer regarded as valid or not, but as having many possible different validities depending on the particular external conditions. This shift in emphasis is reflected in the APA Standards for Educational and Psychological Tests and Manuals of 1966 (later revised in 1974).

The change in emphasis had some effect on the practice of using tests in employment. Initially if a test claimed to measure clerical aptitude, it was felt appropriate to use it for all types of clerical positions for all persons. Then studies began appearing in the literature showing how the test predicted performance in a particular employment setting (see Validity Information Exchange appearing in Personnel Psychology, 1954 to 1965). Somehow this interest declined only to be reawakened by the Testing Guidelines of the Equal Employment Opportunity Commission and the Office of Federal Contract Compliance, which arose out of legislation regulating non-discrimination.

These new regulations gave emphasis to -

- empirical data to support the validity of tests (though the alternatives of content and construct validity are described)
- the development of unbiased measures of performance
- spearate evidence of validity for protected classes, primarily minorities and women
- a full description of the relationship between test scores and job performance for each group
- evidence for each job situation

This last requirement is the reason underlying the present study. If a company, a school system, a city, any organization, wishes to use some objective measures to select or promote its personnel, it is faced with the need to conduct a thorough study for each of the jobs in the organization. Becuase of the large number of jobs and the cost of doing an adequate study in each case, the total cost of obtaining evidence to support the use of tests is exorbitant. Currently many organizations are dropping the use of tests (see Wall Street Journal, September 3, 1975) or restricting them to certain jobs for which studies have been completed. Unless some alternative validation strategy is devised, subjective impression will replace objective measurement to a large extent. How can the validation process be modified to make it more feasible yet provide the necessary empirical evidence? (Are there alternative methods for validating tests over a large number of jobs that will both maintain the high standards of research and yet require a less extensive program of research?)

Proposed Solution

Even before the pressure introduced by EEOCC guidelines, a series of investigators at Purdue University pursued the development of a procedure called "synthetic validity." In this method, job analysis data are obtained to show the human ability requirements of the job. If there is evidence that the predictor measures the required ability, then the test is said to be valid for that job. Instead of a direct study of job and test performance, a link is established between the predictor and the criterion through the system of ability requirements. The latter data are obtained through the use of the Position Analysis Questionnaire (PAQ). This procedure has been studied extensively and the reader is referred to the PAQ Manual for further discussion and references.

The present project proposes another alternative that avoids synthetic validity and judgments about ability requirements of the job. This procedure rests on job analysis which carefully specifies the nature of the tasks performed. The link between predictor and job is the "task cluster". A task cluster is an associated group of specific tasks which are found repeatedly over various jobs. It is broader than a single task and narrower than the total job.

The objective of this project is to identify typical clusters and demonstrate the feasibility of conducting validation studies not job-by-job but by task clusters. The assumptions underlying the approach are:

1. these units of work (called task clusters) can be identified, defined and validated.

2. these task clusters are more stable than jobs. Jobs change regularly due to reorganization of duties, modification of work flow, and technological changes. Thus job validation studies may go out-of-date even before they are finished. While one task cluster within a job may change, other significant clusters in the job will remain the same.

3. task clusters which are essentially the same appear across many jobs, especially entry jobs. The content of the task cluster may differ from job to job but the essential process is the same, e.g. alphabetical filing is the same whether the material filed relates to outer space or house paints.

4. there are fewer task clusters than jobs, thus reducing the number of necessary validation studies. (See below for further description of this assumption.)

5. if a test is valid in predicting performance on a task cluster, then it is appropriate to use the test in personnel decisions for all those jobs in which the task cluster is a significant (important) part of the job (just as a criterion measure must reflect an important part of the job).

A task cluster is defined as a group of work activities oriented toward a specified objective. A job is composed of a series of task clusters common to many jobs plus a group of tasks unique to the particular job. This concept is charted as follows.

Chart 1

TASK CLUSTER	Job 1	Job 2	Job 3	Job n
A	✓	✓		✓
B	✓		✓	✓
C		✓	✓	
D		✓		✓
E	✓	✓	✓	
F	✓			✓
G	✓		✓	
Task Cluster N		✓		
Unique Tasks	✓	✓	✓	✓

JOBS

The above chart shows that Task Cluster A appears in Jobs 1, 2, and other various jobs up to Job n. Task Cluster C, however, does not appear in Job 1 at all, but in Jobs 2, 3, and other jobs.

The chart shows also the Task Clusters that comprise each of the jobs. Note that in addition to the clusters there are also certain unique tasks that are included in the jobs.

It is assumed that where any large number of jobs are studied, the number of task clusters (N) will be smaller than the number of jobs (n).

Thus, the development of task modules has the primary purpose of reducing the number of units requiring test validation to a manageable number. How many clusters exist in 100 jobs? What kind of reduction can be expected? The exact answer would depend on performing the analysis for a given set of jobs.

THE DEVELOPMENT OF TASK CLUSTERS AND DIMENSIONS

Task Data

The project began with the search for task data having the following requirements:

1. task data are needed from several hundred jobs
2. the task data must be described in enough detail that similarities and differences can be reliably recognized
3. the level of task analysis across jobs must be similar if not the same. For example, if some jobs are analyzed at the level of bodily movements while others describe broad functions, the task data will not be comparable.

The prime source examined was the job analysis data bank of the Department of Labor. This file on microfiche contains job descriptions for thousands of jobs obtained over several decades and for different purposes. Some served as the basis for job descriptions in the Dictionary of Occupational Titles while a few provided detailed information for the development of predictor instruments and criterion measures. Several different methods of job analysis were used. In many cases the description told the work done by the job but not what was done by the worker. In general it was found that requirements 2 and 3 above were not adequately met.

Other sources of task data were examined. Information about military positions was found to meet the requirements but the Advisory Group felt that the analysis should be applied to civilian jobs in that the demonstration was to be applied to a United States Employment Service test. Other sources had excellent data but across a small number of jobs, e.g. job descriptions for police and fire positions.

The most consistent, high volume source of job data that was found was the Functional Job Analysis Task Data Bank, developed by Dr. Sidney Fine and others. The tasks in this Bank are derived from a large number of clerical, technical and administrative positions within the social welfare industry. This source was supplemented by tasks from a study of clerical, security, and other positions prepared by staff of the Chase-Manhattan Bank with consultation by Dr. Fine. Additional tasks were developed for AT&T Coin Collectors by A.I.R. staff using FJA methods. Through Dr. Fine and the Upjohn Institute, 71 FJA tasks were obtained for child day care tasks and for old age, personal-care home tasks. In total, data from about 1,000 tasks were available all using the same methods and level of detail.

It should be noted that the range of tasks does not cover the whole world of work but is quite limited. The sample does not include work that is heavily "thing" oriented and only a few hundred that are heavily "people" oriented. It is even hard to say that the sample is representative of all "data" oriented tasks for the population of such tasks is not available. Nevertheless it was felt that a very wide range of such tasks was included.

The FJA Task Bank has all the task information on McBee cards (a photo of a typical card follows). A task statement, as defined by Dr. Fine, includes:

a. what workers do
    training content
    performance standards
    general educational development
    worker instructions
    worker functions
b. what must get done
    purpose
    goals
    constraints/conditions
    state of the art, procedures, methods, techniques
    objectives

The task card also shows the FJA level and orientation for data, people, and things, and the GED level for reasoning, mathematics and language. All the quantitative data are coded and punched in the margins of the card (not shown in the photo). This punching allows for rapid sorting of the cards on one or more dimensions of the task.

Method of Analysis

The objective in the analysis of these tasks was to create a taxonomy for describing all data (idea, information) oriented tasks. This would be achieved through identifying common threads running through all tasks and the dimensions of those commonalities.

W.F. - LEVEL			W.F. - ORIENTATION				G. E. D.			
Data	People	Things	Data	People	Things	INSTR.	Reas.	Math.	Lang.	TASK NO.
3B	3A	1A	50%	45%	5%	3	3	3	3	W.E.4

GOAL:

OBJECTIVE:

TASK: Scans/reviews job application completed by client, checking for appropriateness/accuracy of information, thoroughness, and neatness, and suggests improvements in relation to standards and instructions of hiring organization or industry, in order to insure that application is completed properly.

PERFORMANCE STANDARDS

7

Descriptive:

.Warm, friendly, tactful, patient manner.
.Suggestions are clear and appropriate.

Numerical:

.Less than X% complaint regarding worker's manner/attitude.
.In less than X% of cases, suitable application not completed.
.In less than X% of cases, error made in entry of information.
.In less than X% of cases, assistance was regarded as ineffective.

TRAINING CONTENT

Functional:

.How to review form for completeness and accuracy.
.How to coach client in filling out form.

Specific:

.Local standards and instructions for job applications.
.Knowledge of client's situation.

8
IV-2-3
C

1

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Data	People	Things	Data	People	Things		Reas.	Math.	Lang.	
W.F. - LEVEL			W.F. - ORIENTATION			INSTR.	G. E. D.			TASK NO.
3B	1A	1A	90%	5%	5%	3	2/3	2	2	C.I.3

GOAL:

OBJECTIVE:

TASK: Counts/inventories supplies, visually checking quantities on hand, checking previous use records, and considering staff recommendations/comments/requests for purchase of supplies, following S.O.P., in order to obtain information necessary to maintain supply inventory.

8

PERFORMANCE STANDARDS

Descriptive:

.Obtains accurate information.
.Checks supplies as often as necessary.
.Maintains adequate quantity of supplies.

Numerical:

.No more than X instances over X period of time of inadequate or superfluous supply because worker did not check accurately or thoroughly enough.

8 8
I-1-1 V-1-1
A A

TRAINING CONTENT

Functional:

.How to read and interpret an inventory and use record: lists, numbers, etc.

Specific:

.Knowledge of S.O.P.:frequency of supply check; from whom requests/comments about supplies may be received.
.How to find and use inventories and use records.
.Knowledge of location and organization of supply storage.
.Knowledge of what kinds and amounts of supplies are required for storage: which get used most quickly, which are most crucial, etc.

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A frequently used method of analysis is illustrated in the work of Dr. McCormick and his associates at Purdue University. They obtained several hundred one-line task descriptions, and ascertained which ones were checked for the same job. Through factor analysis they learned which tasks are likely to appear together, e.g. typists also tend to file. Since the tasks in this project did not generally reveal the job from which they were taken, the statistical approach was not feasible. Moreover the search was for dimensions which more dynamically described the job activies.

Three persons, independently using a deck of McBee task cards, set out on the search for a taxonomy. One gave emphasis to the ratings of task levels, another to task orientation, and the third to GED ratings. The tasks were read over and over, sorted and resorted many different ways, always looking for commonalities, continued, and bases for differentiation. Actually the three initial approaches provided little new insight. But as this process continued, it was found that the content of the task (welfare application, personnel appraisal, correspondence, deposit slips, etc.) had to be ignored and emphasis given to the processes that were being performed. Once this leap beyond content had been made, new sets of commonalities started to arise. At first there were only a few, like giving out information and classifying material.

This insight led the group to realize that this entire field of work dealt with aspects of information processing. Realizing that other research groups expert in this field had probably already developed taxonomies for information processing, the search was directed into these sources. Looking for such systems the group examined books on logic, language of computers, information processing, language, syntax, psycholinguistics, concept formation, tests of higher cognition, even to teaching classifying skills to disadvantaged pre-school children. No common set of operations or tasks was found. Each author was different and yet there was great overlap. Concepts such as identily statements, manipulating data, counting, sorting, etc. appeared across these many different disciplines.

From all these sources we culled statements or definitions of operations in information processing. Each such operation was placed by the readers on 3 x 5 cards. Comparing these statements facilitated the identification of overlapping or identical processes with different names, operations that were unique (different from all others) and those that were combinations of more fundamental processes, or those that were performed in a special serial order.

Then, even before a summary set of operations was developed, the research turned back to the detailed, real-life task statements. (Perhaps this was due to a concern that the search was departing from practical tasks and into hypothetical cognitive realms.) Each McBee task card was reexamined to see if any of the operations from the 3 x 5 cards appeared. And indeed, the words of the task statements could easily be translated in many cases to the terms of the budding list of operations. Such task verbs as sorting, judging, deciding, categorizing, etc. came to have much more meaning.

It was also noted that the task statement was sometimes incomplete. Some additional associated operation had to have been performed but the task, as written, either assumed this was already part of the task or had simply omitted the needed information. From personal knowledge of the task, the task statement could be supplemented with additional operations (e.g. what the bank teller does with the deposit slip after comparing deposit amounts with the deposit slip entires). In other cases where the task was not known well, it was recognized that there must be some job aid, some instruction, some procedure, some supervision that must be at hand to supply certain informational needs.

For some task statements there did not seem to be a relevant operation in the deck of 3 x 5 cards. This made sense when the top of the card showed that the task was described as thing or people oriented. It was thereupon concluded that there would be no attempt in this project to develop even partial taxonomies in these fields. Efforts would be limited to describing tasks within information processing, a tremendously broad field ranging from the mail clerk to the president.

Many tasks with the same verb or operation seemed to fall over quite a range of difficulty. For example, "looking up information" might be relatively easy (e.g. a phone number in a directory) or quite hard (e.g. searching for psychological principles to be used by a group of counselors). "Categoring" could be easy in a task of alphabetizing but somewhat hard in deciding whether a given personal loan situation was acceptable or unacceptable. It was decided that there would be no attempt to apply difficulty levels to each of operations. It was clearly recognized, however, that unless the task taxonomy provided for more detail than just "looking up" or "categorizing" ("sorting", "classifying"), the system would be incomplete.

As attention was turned back to the task statements, focus was given to the goal of identifying common steps that appeared across most tasks. Even with a preliminary list of operations, it was clear that most tasks involved three features:

1. information was received or obtained from some source (task input)
2. the information was manipulated in some way
3. the result of the manipulation was given out in some way (task output)

A study of the various sources of information used on the tasks revealed eight main categories or dimensions (described subsequently). These eight sources, either alone or in combination, were enough to describe all the tasks. Similarly, seven methods of giving out information could be differentiated.

It was much harder, however, to find concepts that organized the wide variety of information processing tasks. What would bring together such verbs as: matches, compares, sorts, catalogues, files, checks, proofreads, verifies, routes, refers, posts, tabulates, rates, decides, evaluates, judges, appraises, approves, counts, measures? The conclusion was that the central process of all these tasks was taking a specific case and deciding into which category it should fall. At first, the word, sorting, was used to describe this process. For most lower level tasks this work applied very well. At more complex tasks, sorting seemed too simple a word. If the task was deciding if a certain welfare applicant qualified for a given program, sorting seemed too simple, and we shifted to the term, classifies, as a generic term to describe all the tasks covered by these verbs. All these tasks involve having information about a case or condition and then placing that case into a category (often as simple as yes vs no) according to some classification system. Here are some examples of this kind of task that are not ordinarily thought of as classifying:

1. a signature on a safe deposit form is compared with a signature on a record card and the employee is asked to indicate whether the first is the same or different from the second.

2. a receptionist learns the nature of the visitor's needs and refers the person to the relevant office.
3. a clerk posts account data in proper ledger columns.
4. an interviewer combines standard test scores, and reports whether examinee qualifies for the top job.
5. a guard evaluates whether air passenger is potential hijacker.
6. a Senator or President decides whether a given set of national and international conditions warrants calling for an atomic bomb or not.

"Classifies" as now understood covered nearly all the information processing tasks, except for a few operations that were at rather high GED levels (4, 5, and 6). These involved inferring/deducing, abstracting/summarizing, and creating new classification schemes. Since these activities were at such high levels and hence irrelevant to BOLT, the full development of these classes was not pursued. In fact, there were not enough such tasks to make any further distinctions.

Within the wide range of classification tasks there was a need for further dimensions to differentiate one task from another. Various dimensions were tried out. Their effectiveness was judged by:

1. whether it helped to describe the differences between tasks.
2. whether it was a characteristic found in many, if not most, tasks.
3. whether the dimension enabled one to envision more accurately just what the worker performed on the task.

It is proposed that the most crucial evaluation of a set of dimensions is whether or not independent readers of a given task cluster will construct essentially the same work sample test. If their work samples differ, then there still remains some ambivalent interpretations and different or more detailed descriptions are needed. This method could not be properly applied by the project staff since they had become overexposed to these descriptions. The method, however, is proposed for future similar studies.

It was found that only two additional dimensions appeared necessary in understanding each task and highlighting task differences. They were:

1. What is the number of characteristics, considerations, or factors that a worker must consider in order to classify a particular case into the right category? If the worker is sorting nickels and dimes by hand, the

decision is made by one characteristic, size. If one is deciding what action to take with Turkey as that nation permits farmers to grow poppies, the number of considerations is quite large. It was found that the majority of tasks required the consideration of only one or two factors.

2. How clear are the distinctions between the categories which the worker must use? Are there specific procedures to define the classes, perhaps through using easy objective measures? For example, everyone 50 years and older will be given treatment A. Nickels are readily distinguished from dimes. But if the worker is deciding whether a given city is an average or above average location to build a manufacturing plant, the worker is not only faced with a high number of factors about the city to consider, but he has no well-defined way of combining the data to distinguish the category "above average" from the category "average".

Perhaps it would be useful to present some of the task dimensions that were considered and discarded for various reasons:

1. The number of categories was considered as a potential significant aspect but later discarded. Having only two categories may make the operation very easy or very hard. Sorting a group of two colored forms is not significantly different from sorting five or eight colored forms, as long as the color categories are distinctly different.

2. Doesn't one need to know something about the distinctiveness of the factors used to decide the individual case? If the case's characteristics are sharply defined (objective, specific, clear), doesn't this make the task easier than if the characteristics are muddy (e.g. degrees of loyalty or integrity)? The answer was yes, and for a long time a separate dimension was used. We found, however, that the ratings of this dimension and the ratings for distinctiveness of categories was always the same. We apparently do not need both dimensions. There are probably some exceptions to this parallel rating but within our sample of tasks they did not appear with any frequency.

3. Tasks also differ in the clarity of the rules for combining case characteristics to determine the categories. A worker may follow a mathematical formula in combining personnel test data or in evaluating a long application but how does a secretary weight the characteristics of an office visitor to decide whether the visitor should be given an appointment with the

boss or not? Again, after working with this dimension for some time, it was found that it, too, tied closely to how well the categories were defined. If the boss says to give appointments to all people with certain clean-cut characteristics (e.g. customers with annual sales volume over $50,000), the task becomes quite different.

4. We also considered at length the seriousness of the consequences of mis-classifying. Isn't the task of approving or disapproving a multi-million dollar international loan quite different from a $500 loan on an auto purchase? The answer is yes but it was found that the difference in tasks was adequately described in our two accepted dimensions. The big loan involves a large number of case characteristics and no one has developed clear cut distinctions between an acceptable and an unacceptable loan. (These distinctions could be made by creating objective methods of measuring case characteristics and then defining the categories in terms of those measures. This is what has been done to reduce the job of classifying auto loan applicants into a fairly simple task. This reduction has occurred continuously in the tasks found in business and industry.

The final product of the search for a task taxonomy was a schema using five dimensions as presented on the following pages. The overall structure has:

1. Task input. 8 ways in which input differs
2. Task action.
    a. 9 varieties of manipulation
    b. 3 levels on the number of characteristics or rules considered in the manipulation
    c. 3 levels of clarity for those rules
3. Task output. 7 modes of output

TASK CLUSTER DESCRIPTION SYSTEM

The following system applies to tasks which are data (idea, information) oriented. A task cluster description is considered complete when all five dimensions are adequately defined.

First Dimension: The nature of the source of the information/data with which the worker deals, with eight categories or codes. The first five categories relate to tasks of seeking out information. In the last three categories the worker does not have to look up or hunt for the information but has it on hand for various reasons.

The verbs used to describe this operation include: seeks, looks up, locates, obtains, observes, asks, requests, elicits, interviews, consults, discusses, converses, talks, listens, collects, gathers, searches, researches.

1. the information is a source published outside the job and is well organized for use of a standard operating procedure to obtain the information (e.g. directories, time tables, maps, catalogues, rate schedules, dictionary, etc.).
2. the information is obtained from persons at hand who have the information readily available upon being asked.
3. the information is obtained from published sources which are not directly oriented to provide the information sought (texts, encyclopedias). May have to search for these sources.
4. the information is obtained from persons who may or may not have the information readily at hand. Special skill is required in eliciting the information, usually dealing with the person's attitudes, needs, personal relationships, etc.
5. the information comes from observation of current events, objects, conditions, people.
6. the information used has been memorized from written sources either published outside or in-house.
7. the information comes from memory of past personal experiences or from special education.

8. the information is not sought but comes to the worker in a form ready to be manipulated. These tasks relate to the host of people whose work is delivered to the mail basket.

Second Dimension: Describes the kind of manipulation of the data (what is done to or with the data sought or received in phase 1 (first dimension). Manipulation also has nine dimensions, using Roman numerals to distinguish them.

The verbs used to describe these operations include: matches, compares, sorts, routes or refers (mail, forms, people), posts, tabulates, rates, decides, evaluates, judges, approves, counts, measures.

I comparing two sets of data to see if the components are the same or different.

II examining a set of data to identify any missing information.

III sorting (filing, compiling, posting, etc.).

IV classifying (evaluate, assign, catalogue, select, etc.).

V computing (including counting of cases falling into special categories).

VI abstracting (summarizing, condensing, etc.).

VII deducing/inferring.

VIII creating/innovating (authoring).

IX no manipulation described. (Persons copies data from one place to another without any modification of it.)

Third Dimension: Describes how many characteristics of a case or the number of rules that must be considered by the worker in sorting or classifying, or, more generally, manipulating it. This dimension applies most clearly with tasks of sorting and classifying and less well with others. As tasks are presently described in the cards, it was often difficult to be sure of the proper coding of the task on this dimension. Three levels of descriptions were used:

1. one or two characteristics are considered. (filing by numerical order)
2. three to five characteristics are considered. (classifying qualifications for low income housing by age, number of dependents and income)
3. more than five characteristics are considered. (planning activity program for senior citizens)

Fourth Dimension: Describes how well-defined the decision rules are by which categories are formed. Is the worker dealing with hard and fast (definitive) rules or general concepts/principles. Three distinctions were made.

1. there are specific rules and standards easily identified, as required by the task.
2. the manipulation of the data requires a technical measurement system, usually known only by a specialist.
3. the task requires the use of general guidelines without fixed rules, usually verbal concepts, e.g. degree of need, urgency, risk, neatness, etc. (Management generally seeks methods of removing the task from this category to specific rules.)

Fifth Dimension: Describes the nature or form of the output of the manipulation task. Seven categories were identified and a letter code used.

The verbs used in describing this operation include: informs, answers, explains, gives out, describes, discusses, offers, talks, provides, advises, recommends, tells, teaches, instructs, records, compiles, notes.

A. the data are placed in a standard written form or physical objects may be handled with standard operating procedures, e.g. filing, counting cash.

B. the output is in written form but following only general guidelines (not specified as in A).

C. the output is given to one or more persons in a standard form (simple information given in reply to a question).

D. the information is given to persons following only general guidelines (explaining, making a speech).

E. the information is given to persons but without any guidelines (found only once).

F. the information is in written form but without guidelines (as in writing stories).

G. the information is directly used by the worker in another task (e.g. worker studies a map to find shortest route and then drives by that route).

Sample Cluster: The code for the most frequently found cluster is as follows: 8 III 1 1 A. This says that the worker deals with information that comes to the work setting ready for manipulation, that the worker sorts, files or compiles the information in some way, that the sorting is rather simple, following well-specified rules and that the output is in a standard written or physical form. This well describes many filing/coding tasks and also a wide variety of other tasks.

We have used the term, cluster to describe these configurations of tasks.

FREQUENCY OF TAXONOMY DIMENSIONS

With the adoption of the task dimensions as just described, all tasks were then coded following this system. In several cases coding was very difficult because the task had not been prepared with these dimensions in mind. The information most often lacking dealt with the third and fourth codes, the procedures followed by the worker in manipulating the data. In making the coding decisions, the staff were obliged to use their personal knowledge of the task or work from the descriptions of the training content and performance standards.

Since interest was primarily in information handling tasks (as contrasted to thing, and people tasks), the cards were sorted to identify those tasks with 50% or more orientation toward data and GED's lower than 5. A total of 531 such tasks was found. An additional 166 tasks with data orientation of 30-45% were also located and were separately analyzed. For purposes of the following discussion, tasks with 50% or more data orientation were used.

With the coding system used, there was a potential of 4,536 different clusters (8x9x3x3x7). Below is a tabulation of the frequency of appearance.

Table 2

Frequency of Tasks with the Same Cluster Code

(Tasks with Data-Orientation of 50% +)

Clusters Occurring Only	Number of Clusters	Number of Tasks Involved	Percent of Tasks Involved
Once	74	74	14%
Twice	22	44	8%
Three times	8	24	5%
Four times	3	12	2%
Five times	4	20	4%
More than Five times	26	357	67%
Total	137	531	100%

Note two important findings from the above table:

1. a limited number of possible clusters (137) was found in this sample of tasks. A more extensive sampling of tasks would undoubtedly reveal a larger number of clusters but a number far short of the possible combinations.

2. 67% of all tasks was found to have the dimensions of one of 26 task clusters. Thus a study of a relatively limited number of clusters covers the bulk of tasks.

Characteristics of 26 Common Task Clusters

It was decided that further work should concentrate on the development of cluster performance measures for these 26 task clusters. The dimensions of these clusters were examined in detail. The frequency that each dimension occurred in the tasks and the number of clusters represented are shown in the table below.

Table 3

Information Sources

First Code (Source of data)	Number of Tasks	Number of Clusters
8 (comes to worker)	241	12
1 (SOP from written)	37	4
5 (observation)	35	4
2 (SOP from people)	15	2
7 (experience, educ.)	13	2
4 (elicit from people)	9	1
3 (search in written)	7	1
6 (memory of sources)	0	0
	357	26

Among the 26 clusters, the bulk of tasks involve work where the information comes to the worker without any search required. (code 8)

Table 4

Maniuplation in Cluster Tasks

Second Code (Manipulation)	Number of Tasks	Number of Clusters
IV (classifying)	119	10
III (sorting)	111	5
V (computing)	40	3
IX (no manipulation)	39	3
I (comparing)	35	3
II (missing data)	13	2
VI (abstracting)	0	0
VII (deducing)	0	0
VIII (creating)	0	0
	357	26

The absence of tasks for abstracting, deducing and creating reflects the removal of tasks at GED Level 5 and higher.

Table 5

Third and Fourth Codes (Characteristics of Data)	Number of Tasks	Number of Clusters
1-1 (1-2 specific rules)	201	12
1-3 (1-2 general concepts)	6	1
2-3 (3-5 general concepts)	34	3
3-1 (5+, specific rules)	6	1
3-3 (5+, general concepts)	71	6
IX no manipulation	39	3
	357	26

Table 6

Fifth Code (Output Mode)	Number of Tasks	Number of Clusters
A (standard written)	276	18
B (general written)	81	8
	357	26

Note that all outputs of these clusters were written. This reflects that the tasks were data oriented at a low GED level. The task of a receptionist or guard directing visitors to the proper office, while a sorting task, is judged to have a 50% people orientation and hence was excluded. Tasks of presenting training material or counseling were judged to have GED levels at 5 or greater.

Table 7

Clusters

Below is a listing of the codes for the 26 clusters and the number of tasks found in each. (Total 357)

Cluster					Number of Tasks
1	I	1	1	A	7
1	III	1	1	A	11
1	V	1	1	A	7
1	IX			A	12
2	III	1	1	A	6
2	IX			A	9
3	IV	3	3	B	7
4	IV	3	3	B	9

Table 7 (continued)

Cluster					Number of Tasks
5	I	1	1	A	7
5	III	1	1	A	11
5	IV	3	3	B	9
5	V	1	1	A	8
6	None				
7	IV	2	3	B	6
7	IV	1	1	A	7
8	I	1	1	A	21
8	II	1	1	A	13
*8	III	1	1	A	77
8	III	3	1	A	6
8	IV	1	1	A	8
8	IV	1	3	B	6
8	IV	2	3	A	12
8	IV	2	3	B	16
8	IV	3	3	A	18
8	IV	3	3	B	21
8	V	1	1	A	25
8	IX			A	18

*The code for this most common cluster is read as:

8	the information all comes to the worker
III	who performs a sorting (filing, posting, compiling) task
1	involving only one or two rules
1	of definite nature
A	putting the results in standard written form or files.

DEVELOPING MEASURES OF CLUSTER PERFORMANCE (CPM's)

The identification of task patterns (clusters) that frequently appear marked the first major product of the project. It is these clusters which have been recommended as the units of validation rather than an entire job. The project proposal planned to select out of the then undetermined number of clusters ten clusters for which performance measures would be designed. These criterion task cluster measures (CPM's) would be applied to minorities and whites, males and females and the results compared with their scores on the USES Basic Occupational Literacy Test (BOLT).

Selection of Clusters

A primary requirement for the selection of ten clusters from the 26 common ones was that there measurement be feasible in large scale administration (possibly fifty examinees at a time). It would be more difficult to administer measures for the following clusters:

1. those which require current on-site observation of events, conditions, or people (first code - 5). This measurement could be handled through presenting a set of slides or a movie but this would be more costly. Hence the four clusters with codes beginning with 5 were excluded.

2. those in which the worker seeks information from a person, clusters with a first code of 2 or 4. This situation could be built for individual measurement but hard to conceive in group administration. Hence these three clusters were set aside.

3. those which require the worker to use general published references which are not directly oriented to the task (e.g. tests, encyclopedias) (first code 3). Aside from the problem of providing adequate supplies for each examinee, the more restrictive element is that the worker requires more time in searching for the material and few output measures can be obtained in the 25 - 40 minutes available for any one of the CPM's. This principle excluded one cluster.

4. those which require a particular past personal experience or special education (e.g. selecting appropriate games for handicapped children, building menus for certain diets). This problem put aside two clusters with a first code of 7.

5. those which require knowledge of a complex set of rules to be learned and applied (third code at level two or three). There would not be time in 25 to 40 minutes to provide this instruction. This is especially true if the manipulation of data involves general concepts rather than hard rules (fourth code of 3). This restriction ruled out five of the clusters beginning with 8.

The above restrictions suggest that 15 of the 26 clusters could not readily be measured in the limited time/group setting. This left 11 clusters for consideration. Cluster 8 III 3 1 A was examined and found to be a description of the task of taking dictation (coding of multifaceted speech variables according to fixed rules with a standard written output). Since the examinees would not have this skill, the cluster was dropped. For the remaining ten clusters, typical tasks were developed from which 13 possible measures may be obtained.

Cluster Code					Brief CPM Description
8	I	1	1	A	Comparing addresses on cards in a 3 x 5 file box with those on a list.
8	II	1	1	A	Checking missing data in a set of application forms.
8	III	1	1	A	Filing and alphabetizing a set of appliance dealer's cards.
8	IX			A	Copying data on housing qualifications.
8	IV	1	1	A	Classifying the size of apartment for which cases are qualified.
8	IX			A	Transcribing data from set of application forms to a summary sheet.
8	IV	1	1	A	Coding data from same set of application forms.
8	V	2	1	A	Computing data from personnel report (includes counting).
1	I	1	1	A	Comparing addresses and phone numbers on a list with those in a telephone directory (different from #1 only in that a search must be made for the phone numbers in a standard outside reference).
1	III	1	1	A	Sorting zip codes by the first three digits (compiling data).
1	V	1	1	A	Calculating postage charges for sets of mail.
1	IX			A	Looking up phone numbers in a standard directory and copying them.

Requirements

In developing the performance measures for a given cluster, the task cards for that cluster were examined to identify typical tasks. It is important that the criterion measure exactly reflect the dimensions of the cluster definition. All aspects of the process used by the worker must be involved in the CPM. The particular subject matter or forms that are used are of little importance as long as technical knowledge is not required (input dimensions 6 or 7). (In support of this point, it was later found that persons with limited literacy ability could accurately do tasks involving the use of concepts such as certified and registered mail without having knowledge of just what they mean, other than some kind of mail.)

Tasks in which a minimum of equipment and supplies were sought to reduce costs and administration problems. A range of difficulty was believed desirable to relate to a range of literacy ability as represented by the BOLT.

Instructions

Instructions were made as simple as possible. Practice exerices were introduced to enable workers to understand the process and encounter any difficulties they might find. They were encouraged to ask questions. Administrators were told to repeat instructions as needed. On the one hand standardization of measurement was sought to make performance comparable across groups. On the other hand the administrator was to be more in the role of a supervisor trying to make the task clear to the worker.

Time Limits

It was felt that on only a few jobs is there a premium on quickly completing the task (e.g. keypunching). Therefore it was felt desirable not to have restrictive time limits to reduce the performance of slow workers. Early drafts of the CPM's were tried out on groups without time limits. It was found that a few persons would continue working long after all the others had finished. Rather than to continue at such lengths it was decided to seek a time limit within which 90 - 95% would finish. (See Results for actual % completing.)

Performance Measure

Performance on each cluster was judged in terms of the number of tasks performed correctly. All CPM results were checked by two persons. Any questions were referred to a Chief Scorer. For each measure the number of tasks attempted was also recorded. These results were used to evaluate the time limits but not used in the validation analyses.

All directions for administration, recording of performance and preparing measures are presented in the Appendix.

PROCEDURES FOR THE VALIDATION STUDY

Subsequent to the development of the CPM's, the study objective was to ascertain the relationships of the Basic Occupational Literacy Test (BOLT) test scores to performance on the various task clusters. BOLT is a test of basic reading and arithmetic skills for use with educationally disadvantaged adults. Reading skills are assessed by a Reading Vocabulary subtest and a Reading Comprehension subtest. Arithmetic skills are assessed by an Arithmetic Computation subtest and an Arithmetic Reasoning subtest.

BOLT Reading Vocabulary (RV), Reading Comprehension (RC), and Arithmetic Computation (AC) test forms are available at four levels of difficulty. BOLT Arithmetic Reasoning (AR) test forms are available at three levels of difficulty.

The content of BOLT items is generally suitable for adults; content pertaining to school, toys, and other children's activities is not used. In general, reading content is similar to that found in newspapers, popular magazines, or nontechnical instruction manuals.

Time limits for BOLT are generous enough to permit most individuals to attempt to answer every item, 15 minutes for each Reading test and 30 minutes for each Arithmetic test.

Most of the applicants who are scheduled to take the BOLT will be the same applicants who are scheduled to take the Nonreading Aptitude Test Battery (NATB).

In addition, anyone who is scheduled for a Spanish Language version of the GATB or NATB is given the BOLT to see whether he can be placed in English speaking training or work environment.

There may also be instances when an individual has been given the entire GATB or a certain SATB and the Counselor has doubts about the adequacy of the individual's literacy skills for immediate employment or occupational training. Such an individual is scheduled for BOLT testing.

Study Design

Because BOLT had been introduced only recently to the State Employment Services, there were few cases available where follow-up would have been possible. Instead a different type of study design was adopted, more like a concurrent validation study yet of a different nature. It was planned to administer the BOLT and the CPM's at the same time. This arrangement had both advantages and disadvantages. It meant that there would be no loss of sample between predictor and criterion measures, thus avoiding a restriction in range. More standard control of criterion measurement could be achieved, contrasted to obtaining measures over a myriad number of employment sites. On the other hand, task clusters of very simple nature would have to be utilized, where previous experience was not necessary to the performance of the task. (It was later found that only about 10% of the sample had ever had any paid experience doing anything like the tasks.) The lack of time between predictor and criterion measurement is both disadvantage and blessing. On the one hand, there was not the usual lapse of time occurring in employment, but on the other hand there were not the unfortunate modifying effects due to differential training, supervision, kind of experience, length of exposure, etc. that happen in the customary intervening period.

Collection of Data

The United States Employment Service made arrangements with the Employment Services of twelve States to administer BOLT subtests and CPM's to persons for whom the BOLT was considered appropriate. Staff of the American Institutes for Research visited the testing and research staffs of the selected States to describe the program, and instruct them in the data collection procedures. The cooperation of these State personnel was excellent and their contribution to the project is greatly appreciated.

East State was asked to provide a particular segment of the total sample, covering certain BOLT subtests, certain CPM's, and certain ethnic/racial groups. States were selected in part in light of their ability to provide certain ethnic/racial samples. All States were asked to obtain an even balance of males and females for all groups and this was achieved to a large extent.

It was planned that no person would be asked to take more than two BOLT subtests and three CPM's requiring a maximum of three hours. As it turned out, it was difficult to get the number of persons required, and since some persons were willing to take more time, additional BOLT tests were given and occasionally more CPM's were administered. In all cases Form B of BOLT was used, a form not regularly used in the field. The Wide Range Scale was administered first to determine, along with reported educational level, the level of BOLT test to be given to the particular individual. Generally while these were scored, a CPM would be given. This would be followed by two BOLT subtests, either the arithmetic tests or the reading tests. Finally the remaining CPM's were administered. Suitable rest periods interspersed the administrations.

Sample

It was not easy to obtain the desired sample of persons and the State personnel are commended for their work in gaining cooperation of various groups to participate (voluntarily and without pay) in the study. People were obtained from such places as manpower training programs (MDTA), walk-ins at ES offices, WIN participants, half-way house for ex-offendors, GED training classes, Neighborhood Youth Corps Program, prisons, State Vocational Rehabilitation Service, and Indian Reservations. The search for volunteers was made more difficult by the requirement that they fit the ethnic/racial requirements and have a low literacy level appropriate for BOLT. The period originally planned for collecting data had to be extended several times to allow for collecting an adequate sample of all groups.

It was particularly hard to gain cooperation of Indian groups. Many times sessions were scheduled only to have no one or very few Indians appear. Thus the Indian sample is the smallest and the full cooperation or motivation of all participants is subject to question.

The wide variety of settings and motivations for the measurement sessions is considerable. The fact that the data show considerable congruence despite this wide variance attests to the competence of the administrators.

While there are several cases of unusual score patterns, it is remarkable that this did not occur more often. It seems clear that in some cases the examinee who was doing reasonably well suddenly decided to quit trying and attempted very few items. Frustration, decrease in motivation, peer interactions, headaches, etc. all could easily provide deviate responses over the fairly long sessions.

Background Data Sheet

In addition to the BOLT subtests and CPM measures, each volunteer was asked to complete a personal background data sheet (see Appendix). This form requested information on age, sex, education, and ethnic/racial background.

Data Analysis

This study has 312 component parts. There are four predictors (the four subtests of BOLT). There are thirteen measures of task performance, and there are six groups of persons (4 ethnic/racial and 2 sexes). 4 x 13 x 6 = 312. For each of these components a separate scattergram and associated statistics were produced. These statistics are number of cases, mean and standard deviation for predictor and criterion, correlation coefficient, intercept, and slope. Tests of significance were run for all group differences for predictor means, criterion means, correlations, intercepts, and slopes.

RESULTS

SAMPLE DESCRIPTION

The final sample on which the analysis was run had the following characteristics:

Ethnic/racial Groups		N	%
	Negro	525	25.1
	Indian	442	21.1
	White	596	28.5
	Spanish	530	25.3
	Total	2,093	100.0%
Sex			
	Male	1,044	49.9
	Female	1,049	50.1
Age			
	- 16	12*	.6*
	16 - 19	617	29.5
	20 - 24	594	28.4
	25 - 29	319	15.2
	30 - 39	318	15.2
	40 - 49	151	7.2
	50 - 59	66	3.2
	60 - 69	16	.8
Education			
	Grades 1 - 6	90	4.3
	7 - 11	1,408	67.3
	12	488	23.3
	More than 12	107	5.1

* Removed from later analyses.

Wide Range Scale	Part I		Part II	
1	18	.9%	12	.6%
2	55	2.6%	38	1.8%
3	132	6.6%	97	4.6%
4	180	8.6%	162	7.8%
5	291	13.9%	228	10.9%
6	354	17.0%	322	15.4%
7	343	16.4%	401	19.2%
8	299	14.3%	367	17.6%
No Score	416	19.9%	461	22.1%

BOLT

	Level	N	%	Mean	Std. dev.
AR	1	770	61.4		
	2	388	30.9		
	3	95	7.6		
	4	1	.1		
	Total	1,254	100.0	103.6	20.36
AC	1	583	45.7		
	2	266	20.8		
	3	294	23.0		
	4	132	10.3		
	Total	1,276	99.8	109.6	21.22
RC	1	457	35.8		
	2	287	22.5		
	3	464	36.3		
	4	70	5.5		
	Total	1,278	100.1	106.8	20.41
RV	1	455	35.6		
	2	287	22.4		
	3		36.5		
	4	70	5.5		
	Total	1,278	100.0	106.4	19.71

BOLT

	GED Level	N	%
AR	1	115	9.2
	2	566	45.3
	3	232	18.6
	4	337	27.0
AC	1	141	11.1
	2	655	51.4
	3	277	21.7
	4	200	15.7
RC	1	177	13.9
	2	590	46.2
	3	386	30.2
	4	124	9.7
RV	1	106	8.3
	2	565	44.2
	3	319	25.0
	4	288	22.5

Comments: The sample described above is somewhat different from the sample on which the BOLT was standardized. The latter had a higher proportion of persons (about 25%) for whom the easiest level of BOLT is appropriate (Level 4).

The educational data for the study sample suggests that 5% had higher than high school education. This additional education would appear to have been a scattering of special training courses of a wide variety rather than schooling at the college level.

The average performance on BOLT is also above that of the norm group as shown by the mean standard scores on the four sub-tests (ranging from 103.6 to 109.6). Variabilities, however, were very close to the norm group.

CPM PERFORMANCE

The following table shows the overall results for each measure of cluster performance. The distribution of scores in all cases is skewed to the left. Most persons had relatively few errors, as one would hope to find on the job. With greater experience with the tasks, one might expect the proportion of errors to be reduced. The difficulty ranged from .2% errors for copying application data to 46% errors in locating and summarizing personnel information. The personnel task was deliberately selected to include one CPM of greater complexity.

To maximize validity coefficients, it would have been desirable to have a more normal distribution of criterion measures. It was felt, however, that the objective of these task measures was not to obtain maximum differentiation but to seek a reflection of performance on real tasks.

The reliabilities of the CPM's were estimated by means of the Kuder-Richardson formula 21.

$$r_{tt} = \frac{n\,\sigma_t^2 - \overline{RW}}{(n-1)\,\sigma_t^2}$$

All CPM's but one had a reliability of .90 or higher. One would have preferred a higher reliability for Locating Personnel Information (.74). With only fifteen items in this CPM it was difficult to obtain the desired reliability, yet this is far higher reliability than many criteria have.

Intercorrelations of CPM's

Because all CPM's were not given to all persons in the sample, it is not possible to have a complete picture of all the intercorrelations. Below is a table showing the relationships where at least 50 cases are available. The median intercorrelation is .46 reflecting about 20% common variance. The r's range from .19 to .86. The highest correlation reflects a pair of scores from the same task, coding and copying application data (.86). The second highest correlation is for copying vs comparing telephone information (.81).

There is inadequate data to complete any factor analysis of these data but it seems clear that there is a strong general factor, probably relating to understanding instructions and attending to work. There is no evidence that copying, comparing, and classifying are unique activities.

Administration of CPM's

The time limits established on the basis of the tryouts were intended to be quite generous, allowing practically all persons to finish. With the exception of two CPM's an average of 7% of the persons did not attempt all the items. In some cases it appears that additional time would not have led to completion of the CPM. In several cases it appears that the instructions were not understood. In other cases while a half dozen correct responses were recorded, the remainder was just not attempted.

The Comparing and Copying of Telephone Information had particularly high rates of non-completion, 23% and 32% respectively. Several persons complained they had trouble reading the fine print in the phone book and in time gave up trying.* There was a similar but lesser effect with the use of the Zip Code Directory. This difficulty undoubtedly affected the validity pattern of these CPM's.

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*Some groups complained they had not been told to bring their glasses.

PERFORMANCE ON TASK CLUSTERS

	N	No. of Items	Mean	Std. Dev.	Avg. Errors	% * Errors	Rel. KR-21	% Did Not Finish
Checking Applications 8 II 1 1 A	581	43	39.8	5.57	2.9	7	.94	2
Comparing Addresses 8 I 1 1 A	589	78	70.4	7.36	6.5	8	.90	5
Comparing Telephone Information 1 I 1 1 A	558	50	37.8	11.40	7.7	17	.97	23
Copying Telephone Information 1 IX A	558	628	538.5	140.02	15.2	3	.99	32
Classifying Appliance Dealers 8 III 1 1 A	630	58	55.2	7.79	2.2	4	.98	4
Alphabetizing Appliance Dealers 8 III 1 1 A	586	58	56.1	3.86	1.6	3	.91	2
Coding Application Data 8 IV 1 1 A	580	70	66.5	8.86	1.9	3	.99	7
Copying Application Data 8 IX A	582	224	217.9	24.07	0.5	2	.99	7
Copying Housing Qualifications 8 IX A	581	46	42.9	5.63	2.3	5	.95	6
Classifying Housing Qualifications 8 IV 1 1 A	581	46	39.2	9.08	5.9	3	.96	6
Locating and Classifying Zip Codes 1 III 1 1 A	592	35	32.2	5.55	1.7	5	.98	8
Locating Personnel Information 8 V 2 1 A	523	15	8.0	3.40	6.7	46	.74	9
Calculating Postage Charges 1 V 1 1 A	521	61	50.5	13.46	7.1	12	.98	15

*Mean number of errors divided by mean number attempted.

INTERCORRELATIONS OF CLUSTER PERFORMANCE MEASURES*

CPM	Chk Appl	Comp Addr	Comp Tel	Copy Tele	Class A.Dir.	Alpha A.Dir.	Cod Appl	Copy Appl	Copy H.O.	Class H.O.	Locate Zip Cds	Pers Info	Calc Postage
Checking Applications		X	129	129	X	X	581	582	581	581	X	62	62
Comparing Addresses	X		X	X	564	522	X	X	X	X	503	X	X
Comparing Telephone Information	42	X		555	X	X	128	129	128	128	X	X	X
Copying Telephone Information	46	X	81		X	X	128	129	128	128	X	X	X
Classifying Appliance Dealers	X	42	X	X		585	X	X	X	X	549	X	X
Alphabetizing Appliance Dealers	X	21	X	X	46		X	X	X	X	511	X	X
Coding Application Data	55	X	42	52	X	X		581	580	580	X	62	62
Copying Application Data	47	X	33	45	X	X	86		582	582	X	62	62
Copying Housing Qualifications	50	X	33	45	X	X	62	64		582	X	62	62
Classifying Housing Qualifications	43	X	39	45	X	X	51	48	70		X	62	62
Locating and Classifying Zip Codes	X	52	X	X	53	32	X	X	X	X		X	58
Locating Personnel Information	23	X	X	X	X	X	20	31	35	31	X		464
Calculating Postage Charges	40	X	X	X	X	X	19	46	70	46	71	57	

*Lower left of the table shows the intercorrelations. The upper right shows the N's on which they are based. Where there were fewer than 50 cases, no correlation is shown.

VALIDITY OF BOLT SUBTESTS

Below is a table which summarizes the correlational data of the BOLT subtests by showing the median r for the thirteen CPM scores. These data suggest both statistically and practically significant relationships between BOLT subtests and the various criterion measures.

SUMMARY OF BOLT VALIDITY COEFFICIENTS
MEDIAN CORRELATIONS FOR THIRTEEN CPM MEASURES

	Among Ethnic/Racial Groups (52 r's)	Among Sex Groups (26 r's)
Arithmetic Computation	.47	.46
Arithmetic Reasoning	.41	.37
Reading Vocabulary	.39	.37
Reading Comprehension	.40	.40

Out of the 312 validity coefficients, only twenty-two (7%) failed to meet the 5% level of significance of difference from zero. This suggests that the eighteen cases were just random deviations drawn from a population where there is truly significant correlation. This is not the case. The deviations came largely from Indian groups (10) and from two CPM's (10), Copying Application Data and Alphabetizing Appliance Dealers. These CPM's have low error rates.

On the other hand 25% of the validity coefficients are .50 or higher, with those for Arithmetic Computation excelling. For this subtest twenty-eight correlations out of fifty-two are .50 or higher. Of the four BOLT tests, AC has the highest prediction for most groups.

FREQUENCY OF HAVING THE HIGHEST VALIDITY COEFFICIENT

	Among Ethnic/Racial Groups	Among Sex Groups
AC	35	18
AR	7	6
RV	1	0
RC	9	2

GROUP PERFORMANCE

The means and standard deviations for performance on BOLT (4 subtests) and CPM (13 measures) are presented in detail in the Appendix. In the interpretation of these data it is important to remember the nature of the samples involved:

1. the sample for any racial/ethnic or sex group is not a representative or random sample for that group. No conclusions about the level of group performance can be made by the comparison of sample means.
2. the sample within a group is not the same from one CPM to all the others. Thus, if it appears that, for example, the Indian sample does better on copying telephone information than in calculating postage charges, this difference may reflect only the difference between two non-random samples of Indians.

This set of conditions means that emphasis must be placed on the relationships found between a CPM and BOLT within samples.

BOLT Performance

In all but one case the scores of Whites on all subtests of BOLT was significantly higher than that for Negroes, Spanish, or Indians. The scores of males and females were generally not significantly different. In 6 of 13 cases males had higher scores on Arithmetic Reasoning.

CPM Performance

In 35 of 52 comparisons (67%) Whites performed better than the Negroes. In 25 of 52 comparisons (48%) Whites performed better than the Indians. But in only 16 of 52 comparisons (31%) did the Whites excel the Spanish. In only one case did the minority group have higher performance than the White group.

In no cases did the male CPM performance excel that of the females. On the other hand, females had higher performance in 36 of 52 comparisons (69%).

GROUP DIFFERENCES IN VALIDITY

The validity coefficients, slopes, and intercepts for all within group correlations are presented in the Appendix. The table below summarizes the frequency with which the size of the validity coefficients differed between the 4 ethnic/racial groups.

Table 8

Number of Significant Differences between Validity Coefficients for Pairs of Groups

BOLT Subtest	Total Number of Comparisons *	No Signif. Differences	Signif. at 5% Level	Signif. at 1% Level	Total Signif. Differences	Number Found in Indian Comparisons
AR	78	66	6	6	12	8
AC	78	73	2	3	5	2
RV	78	68	4	6	10	9
RC	78	70	2	6	8	8
Actual	312	279	14	21	35	27
Expected by chance		296	12	4	16	4

The thrity-five significant differences in the correlation between groups do not occur in a random fashion. Rather they concentrate in differences involving the Indian groups (27 differences). Moreover, the significant differences with Indian groups arise largely from two CPM's, Comparing and Copying Telephone Information (19 differences). This strongly suggests that something deviant occurred in the administration of these measures in this group of Indians (both CPM's were given to the same group). (Their performance scores were unusually high with a small standard deviation producing low correlations.) The differences, apart from this one group, reflect the number expected in a population where there are no true differences in correlation.

In the comparison of male and female validity coefficients (13 CPM's x 4 BOLT subtests = 52 pairs of r's), two significant differences were obtained. By chance 2.6 would be expected.

Overall all groups there does not appear to be any serious evidence for differential validity.

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*4 racial/ethnic groups permit six comparisons of group results. There are six such comparisons for each of the 13 CPM measures, or 78 comparisons for each BOLT subtest.

TEST FAIRNESS

While two groups may not have significantly different validity coefficients, nevertheless a "test is biased if the criterion scores predicted from the common regression line is consistently too high or too low for members of the sub-group" (Cleary). The fairness of the test may be judged by examining the slopes and intercepts of the regression lines. The crucial question is whether or not the test underpredicts the task performance of the minority group. (Linn).

Ethnic/Racial Comparisons

Below are the tables which show the frequency of differences in slopes and intercepts by level of statistical significance for the ethnic/racial comparisons with the White group.

Table 9

Frequency of Slope Differences by Level of Significance

Level of Significance	Ethnic/Racial Comparisons W•N	W•I	W•S	Total
Above the 5% level	33	30	47	110
Between 1 and 5%	11	7	3	21
At 1% or lower	8	15	2	25
% of Comparisons at 5% or lower	37%	42%	10%	29%

Table 10

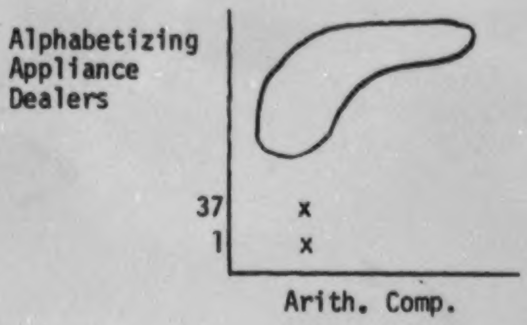
Frequency of Intercept Differences by Level of Significance

Level of Significance	Ethnic/Racial Comparisons W•N	W•I	W•S	Total
Above the 5% level	34	30	47	111
Between 1 and 5%	7	3	2	12
At 1% or lower	11	19	3	33
% of Comparisons at 5% or lower	35%	42%	10%	29%

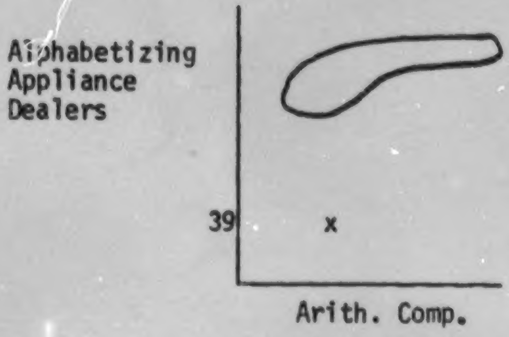
White•Spanish. The number of significant differences in slopes and intercepts between the White and Spanish groups (5) is not greater than chance (2.6). No unfairness would arise in treating these groups with a common regression line for all BOLT subtests and all CPM's.

__White•Negro.__ There are more than chance differences in slopes and intercepts between these groups. Of the 18 significant differences out of 52, in 16 cases the Negro intercept is lower (criterion performance overpredicted). The standard deviation of Negro CPM performance is almost always considerably greater.

To understand the characteristics of these differences, the scatterplots were examined. It was found that the significant differences in slopes and intercepts arose because of a very few deviate cases. For example, the scatterplots for Arithmetic Computation and Alphabetizing Appliance Dealers look like this:



__Negro Group__



__White Group__

The two deviate Negro cases and one deviate White case were removed and all measures recalculated. The results before and after were as follows:

	Before		After	
	Negro	White	Negro	White
N	72	117	70	116
r	.350	.297	.280	.357
slope	.137	.036*	.042	.033
intercept	40.01	52.48*	51.45	53.04
Mean Alphabet.	55.07	56.77	56.13	56.95
Std. Dev. Alphabet.	7.34	2.25**	2.72	1.72**
Mean Arith. Comp.	110.0	118.26**	110.7	118.35**
Std. Dev. Arith. Comp.	18.67	18.46	17.99	18.23

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*Significantly different from the Negro value at the 5% level.
**Significantly different from the Negro value at the 1% level.

Thus it was found that the significant differences in slopes and intercepts found in the summary statistics disappeared when the few deviate cases were removed. As a result all the other Negro, Indian and White scatterplots were examined with care. In many plots a few persons (one to five) had criterion performance more than three standard deviations below the remaining cases. These deviate cases were statistically removed from the scatterplot and new slopes and intercepts calculated, with the following results.

White•Indian. After removal of deviate cases, there were only three comparisons out of 104 in which there was a significant difference in slope or intercept. This is a chance occurrence.

White•Negro. After removal of deviate cases, there were still 22 out of 104 where there were significant differences. These centered in the following relationships:

1. Locating and Classifying Zip Codes vs AC, AR, RV and RC intercepts and slopes. (8 comparisons)
2. Calculating Postage Charges vs AC, AR, RC (but not RV) intercepts and slopes. (6 comparisons)
3. Classifying Appliance Dealers vs AC, AR (but not RV or RC) intercepts and slopes. (4 comparisons)

Sex Comparisons

Slopes. In 18 of the 52 regression equations the male slopes are significantly larger than these for the female groups. These differences reflect in large part the higher standard deviations of the male group on the CPM's.

Intercepts. In 25 of the 52 regression equations the male intercepts are smaller than those for the female groups. Since the a values are partially determined by the slopes, these differences are also affected by the differences in standard deviations.

Removal of Deviate Cases. The same cases were removed from the Male and Female scatterplots as from the racial/ethnic plots. After their removal, there were still 16 comparisons out of 104 that had significant differences in slope or intercept. These centered in the following relationships:

1. Locating and Classifying Zip Codes vs AC, AR and RC intercepts and slopes. (6 comparisons)
2. Copying Housing Qualifications vs AR (slope and intercept) and AC (intercept). (3 comparisons)
3. Copying Application Data vs RC and RV intercepts. (2 comparisons)
4. Copying Telephone Information vs AC and AR intercepts. (2 comparisons)

It appears that in the function of copying, the Males with the lowest literacy skills do not perform as well as their Female counterparts. Many persons of both sexes with very low literacy scores demonstrate the ability to copy. But apparently in this group are more Males than Females who do not have the motivation to demonstrate this ability. Similar performance occurs in the handling of zip codes.

DISCUSSION

Performance Characteristics Related to Cluster Dimensions

The ten clusters varied in the nature of the information-processing performed. Three dealt with comparing, three involved copying, and seven required classifying. The last group had three levels: in two cases the classification involved only a single character of the data (e.g. first letter in the name), three CPM's required use of two characteristics (e.g. judging housing qualifications), and two CPM's called for the use of three characteristics (e.g. postage rates).

The average error rate is related to these dimensions. Copying CPM's average 3.3% errors, while comparing stands at 11% errors. With classification tasks the error rate is about the same when involving one or two characteristics (3% and 4% respectively). The average error rate jumps considerably when the person has to deal simultaneously with three factors or rules (46%). These data suggest to a work designer who is arranging work for low literacy persons:

1. visual comparison of sets of data risks more errors than direct copying.
2. if a job obliges the employee to deal with more than two characteristics of the information (or rules), then either provide supplementary job aids, or break the task into two steps which will avoid the three dimensions.

Whether or not these suggestions apply to those who are above minimum literacy skills remains to be seen.

Relative variability (standard deviation ÷ mean) also differs among these groups of CPM's. Copying and comparing tasks have about the same relative variability (.17 and .18). The three levels of classifying have corresponding relative variabilities of .10, .18, and .35. Thus simple tasks of comparing, copying, or sorting require a larger number of items in order to obtain a reliable measure.

Average validity coefficients for the BOLT subtests vary by task dimension as follows:

copying	.37
comparing	.37
classifying (1 char.)	.30
classifying (2 char.)	.43
classifying (3 char.)	.56

Thus the BOLT tests appear to provide higher predictions as the task is more complex.

Construction of CPM's. The task clusters used in this study were deliberately selected to be easy in order to be feasible for administration with low literacy persons, in group sessions and in short time periods. BOLT was validated against as many as three task clusters in a single "setting." As measures are developed for other task clusters, it will not be as feasible to cover several CPM's at once. The construction of CPM's will be somewhat more difficult but no different from creating other job production measures. Taped instructions (as in dictation tests) can provide standard inputs to workers. Similarly, taped outputs of the worker can be scored later. Objective forms of job performance measures will become more common in light of the demand for unbiased evaluations in personnel administration.

"Pure" Cluster Measures. During administration of the CPM's, State testing personnel pointed out that some measures were not pure, that is, the task called for performance on more than one dimension. For example, in Calculating Postage Charges the worker not only has to calculate (dimension V) but also has to follow as many as two rules in finding the proper rate for a given kind of mail (dimension IV). Such mixtures of dimensions are not desirable. Separate measures of each dimension would be preferable.

Content Validity

A "psychological" analysis of all subtasks involved in Calculating Postage Charges would reveal a minimal requirement for reading vocabulary. The task includes some technical terms (e.g. certified mail) but they do not have to be understood in order to do the task. (Most successful task performers could not have explained the difference between certified and registered mail.) It seems unlikely that RV would have been selected to predict performance on this task. Despite the minimal overt or covert use of vocabulary in the task, RV correlated in the .40's with this module. Validation through content validity would have ruled out this prediction source.

A common source of variance does exist in the two measurement situations. It seems likely that it lies in the response to simple verbal instructions, the kind a supervisor might employ on the job. Those persons who had difficulty in accruing a simple vocabulary may also find it hard to follow the verbal directions at work. This common source of variance may underlie a significant portion of the validity of all BOLT subtests. (One should note, however, that the Arithmetic Computation Test had the highest validity coefficients as a content analysis would have predicted.)

Differences

The 312 scattergrams in the study were reviewed carefully. They dramatize:

1. the skewed distributions for most of the CPM measures.
2. the general positive correlations, with relatively few persons scoring high on the BOLT test doing poorly on the CPM measures. Low scorers on the BOLT often perform well on the CPM's but a higher proportion of them have low performance.
3. the deviate cases. In many scattergrams there are one to six cases that are clearly so deviate from the others that they seem to represent a different group. These cases are generally low on BOLT and unusually low on CPM's. These cases seem to reflect the results of working with low literacy, low motivated groups. One may well expect to have some cases where directions are not understood, seen, or heard. And their performance does distort the overall pattern of results. With samples plus or minus 100, a single highly deviate case can alter the statistical interpretation of an entire plot. With the removal of such a case a correlation jumped from a non-significant .14 to a significant .28. Means, slopes, and intercepts judged to be significantly different fall in line after the removal of two or three cases. Thus, while the data of this study have been reported as obtained, they greatly overestimate the true number of differences.

It seems likely that many other studies reporting differential validities (often on fewer cases) could similarly be affected by a few deviate cases. Considerable future research in this field will be needed to separate the true differential validities from those previously produced by unusual cases. Summary statistics mask the results that scatterplots reveal. But until some accepted rules for removal of deviate cases evolve, we cannot afford to be subjected to the bias of the data analyst in altering the facts and judging the results. On the other hand the mean performance or a correlation from a set of data is not a number to be regarded as fixed and to be neatly classified as either "statistically significant" or not.

Cut-offs

Many employment interviewers, while objecting to the use of fixed cut-off scores for interpreting test results, wish to have some form of interpretive guide. One such guide is the expectancy table which tells the proportion of "successful" workers that one is likely to find at each test score range. In the current project there was no definitive point in CPM performance that marked "success". Under these circumstances a frequent alternative practice is merely to divide the test range into broad intervals based on its mean and standard deviation. This approach describes test performance rather than the predicted job performance. It is a feasible method for BOLT.

The scatterplots have been examined to assist in the interpretation of the scores. Performance above the mean on BOLT generally adds little or nothing to task performance. The primary need is to inform the interviewer of the cases where special attention should be given to the evaluation of all information about literacy skills. It is recommended that test scores below the mean should be interpreted as follows:

BOLT Standard Score	% of Examinees Expected	Interpretation of Score
90 - 100	19%	Mild concern about skills.
80 - 89	15%	Likely to have trouble on task performance.
70 - 79	9%	Very serious doubt as to capability.
below 70	7%	Further literacy training essential.

Performance on Locating Personnel Information involved such a high rate of errors, it is recommended it be treated separately. Its task cluster is coded 8 V 2 1 A, the code "2" indicating that the counting activity involves consideration of as many as three characteristics of the persons in the report (e.g. sex, job, and length of service). This complexity adds considerably to the task difficulty. The average performance on this CPM had 46% errors, far above all other CPM's which averaged only 6% errors. It is the only CPM at this level. Thus special interpretation must be given, reflecting the difficulty that even average scorers on BOLT will encounter on this task cluster. The validity coefficients for this CPM range from nearly .50 to high .60's for all groups with little evidence of any unfairness.

BOLT Standard Score	% of Examinees Expected	Interpretation of Score
135 +	4%	Satisfactory.
125 - 134	7%	Marginally acceptable.
100 - 124	39%	High error rate expected.
below 100	50%	Unsatisfactory - over 50% errors.

These interpretations of BOLT scores do not give full credence to the few cases of differential ethnic/racial and sex performance found. In the case of Negroes, unadjusted score interpretation will provide them with a slight overprediction on a few task clusters. Similarly, the performance of some Males will be slightly overpredicted primarily on copying tasks. Few Males, however, are competing in present labor markets for such work.

Test Fairness

Schmidt, Berner and Hunter have made extensive reviews of validation studies involving data on minority samples. This article concluded that there was a minimum of evidence that minority groups were unfairly treated by the use of a common regression line, and that the frequency of any contrary evidence was not greater than that expected by chance. The study reported here found only a chance number of differences in validity coefficients between minorities and Whites and between sexes. A few differences in variability, however, affecting slopes and intercepts, were greater than chance, even after removal of deviate cases. These instances would not produce unfairness to minorities because their predicted performance exceeded measured performance.

Why is there a differential group performance on only a few tasks? Here are a few conjectures to answer this question:

1. The difference is an "accident" arising from the circumstances of a particular group and events in a particular administration. Perhaps it is surprising that more differentials did not occur in a study with low literacy cases derived from administrations across many states with highly diverse volunteer groups. In any case, evidence will have to be derived from other groups and similar measures before concluding that the obtained differences are "real".

2. Somehow there might have been different motivation for a minority group in its approach to the BOLT and its effort on certain CPM's. If one consistently observed a decline in effort on certain job tasks (as compared to testing), one could conclude that there is a true differential effect. The difference in performance could not be ignored, however, if it arose out of motivational rather than ability factors.

3. A third possibility is that there is something unique about the particular task requirements that induces differential performance. The consistent superior performance of Females in copying illustrates this possibility. A similar regular rationale underlying Black-White differentials was not identified. The only explanation for the fact that Using Zip Codes appeared in both racial and sex differences is that more Blacks and Males could not cope with the relatively small print in the particular zip code directories, a requirement not intended by the task cluster definition.

The correct explanation for the few cases of test unfairness in this study cannot be determined within the data. Only subsequent studies can provide the full answer.

CPM's as Predictors

Some persons in reviewing the study results have suggested that the COM's be administered as content valid measures of future job performance without the use of BOLT. Where one is seeking to evaluate performance in only one task cluster, this approach appears valid. The administration of BOLT, however, allows one to make valid predictions over a wide range of task clusters with a considerable saving in time.

IMPLICATIONS FOR THE FUTURE

The present project had a limited scope on several dimensions. These will be discussed below along with the implications for future work.

Additional CPM's

Task performance measures were developed for only ten of the twenty-six commonly appearing tasks. Their success as an objective criterion is evident. If BOLT is to be applied to jobs having task clusters in the other sixteen areas, the same CPM development principles used here should be applied in the creation of additional CPM's. The present CPM's structured measures which are readily administered in groups. Additional CPM's will probably involve individual administration. For example, where vocal responses are a characteristic of the task, the CPM cannot easily be given in groups.

Some of the additional task clusters (4) involve information coming from direct experience or observation. This will require special structuring of events. Other clusters require manipulation obtained verbally from people: this might be managed via tapes (telephone simulation).

Two commonly observed clusters require knowledge of specific information learned on the job. Moreover these clusters require the use of more than three information characteristics. These clusters cannot readily be generalized and would have to be developed for the specific job setting.

The present CPM's involve all the kinds of maniuplation which are in common task clusters: comparing, sorting, computing, classifying, and handling missing data. The same structures can be applied for the new CPM's. The present CPM's all use a standard written output, the most common task form. Some new CPM's would involve general written responses. These would require special scoring procedures such as those applied in objective scoring of essay examinations.

Identifying Jobs Having Validated Task Clusters

Initially one asked if a test were valid. Then the question became: is the test valid for this specific job in this setting. The present research shifts the inquiry to: does the test predict performance of this task cluster. The data obtained shows in detail how BOLT subtests predict the effectiveness of various groups on task clusters. But how does this information help at the employment desk, where questions center on jobs? It will be necessary to review the job analysis data available in the Employment Service to see which jobs entail which task clusters. In many cases it will be clear if one goes to the descriptions underlying the summaries printed in the Dictionary of Occupational Titles. In many other cases the task descriptions will be too abbreviated to decide what clusters are involved and hence what BOLT standards should apply.

The Appendix provides a guide for the collection of task data which enables one to identify the task clusters which appear in any particular job. This guide (Identifying Task Clusters) can be used either in obtaining data originally from incumbents, supervisors, job analysts, training personnel, etc. or in summarizing task data from other job analysis information. It is often found, however, that most job analysis data is too general to enable one to complete the guide. Upon completion of the suggested form, one can readily derive the codes for each of the important task clusters by completing the following summary box.

Effects of Experience

The present measures were applied to persons with no paid experience on information-handling tasks or with relatively little experience. While the administration of the measures provides some task practice, it is far from the degree of exposure given by a real job. The question then arises as to what degree the relative performance of the various persons in the sample is incorrectly measured. Would they array themselves in the same way if they had all had a considerable amount of practice? Would the obtained validity coefficients be quite different? Are some measures (the more difficult ones) more affected in this way than others? To answer these questions a group of persons (probably trainees) would have to be given a set of performance measures several times during their learning on an information-handling job. If the differential effects of practice are real, then the validity results of the present study are subject to some question.

Another alternative is to identify workers now employed in the performance of one or more tasks for which measures have been developed. They could be given both the standard task performance measures already developed and a task measure tied directly to the content of their present work. These would both serve as a criterion for BOLT or GATB. The question here is whether the task measure tied directly to job content displays the same or higher validity than the more general task performance measure.

SUMMARY OF TASK ANALYSIS

Major Function	A Sources of Information	B Action Taken	C Number of Considerations	D Clarity of Rules	E Task Output
1					
2					
3					
4					
5					
Example	2	VI	3	2	B

Consideration of Other Taxonomies

As the current project has proceeded, attention has been drawn to other taxonomies of tasks in the information-handling field. The systems previously known or discovered include those by McCormick et.al. (Position Analysis Questionnaire), Generic Skills (Arthur De W. Smith, Canadian Training Research and Development Station), Sidney Fine (Upjohn Institute), Samuel Cleff (Personnel Data Systems), United States Army (Clifford Hahn - AIR), and J.W. Cunningham (Center for Occupational Education). It would be desirable to:

1. search for other parallel systems
2. examine the similarities and differences
3. examine possible causes for differences (methodology, sample of tasks/jobs studied, purposes of system, etc.)
4. consider value of one or more systems for future use by DOL or others.

Systems of Tasks Beyond Information-Handling

The present series of tasks was derived from those that are primarily (50% or over) oriented toward data. A further study would seek out people- and thing-oriented tasks and develop a taxonomy for these other areas. As essential dimensions of such tasks are identified, cluster performance measures need to be developed for them.

Methods Used in Developing Taxonomies

The most common method for designing task taxonomies is through some form of factor analysis. This approach seems to tell us the core dimensions of the language used in describing work. The present approach has been to consider in detail the human processes involved in the task and then, through a series of non-statistical analysis, select a tentative taxonomy, apply a series of tests, modify the taxonomy, retest, and so forth until a useful set of classes has been derived. The details of this method, its strategies and rationales could be further developed so that it could more effectively be applied to other task areas and by other task analysts.

Task Analysis

In the current study use was made of task data collected through Dr. Fine's methods of functional job analysis. These data were used because they represented one of the largest task banks with detailed information all collected by the same method. Many tasks descriptions, however, showed that Dr. Fine's instructions for preparing descriptions were not fully followed. The descriptions were not always adequate to understand accurately what was done on the task. After the task taxonomy was roughed out, the gaps in information become more clear. Facts for all the dimensions were not always available. For example, a task might state, "Decides when to order more clerical supplies". This statement says very little about the process the incumbent follows in making the decision. Is there data available on inventory which serves as a basis for decisions? Are there rules for when orders are placed? Does the incumbent have to estimate current rates of usage? Is it important to minimize inventory? Are there job aids to facilitate decision-making? Without these details one doesn't really know what the person does. One knows only the end product of a work function. Dr. Fine warns against such loose definitions but nevertheless vagueness can readily creep into the task descriptions.

Another illustration occurs for the simplest office task: "Routes mail". In such work the incumbent may sort envelopes by room number, or by last name and then room number, or, at a more complex level, may have to read the mail and in light of the contents make decisions based on detailed knowledge of functions and organization. Consider the vagueness of a task which underlies such commonly used phrases as: checks results, proofreads, determines need, searches for materials, composes letters, etc.

It was found that until all taxonomic dimensions were described, one could not really be sure what the person did. And vice versa: one could readily understand what the incumbent did when all the dimensions were described.

What is needed now is a guide to task analysis that will facilitate the complete description of all needed dimensions of the job. The procedures and forms will lead the analyst to elicit complete information. The methods are likely to draw more data from the incumbent, learning the thought processes that are being followed during the task. Simple observation of behaviors doesn't tell the whole story. But the search for detailed information must not be so cumbersome as to be impractical. Thus the need for a manual to make the job of collecting detailed information as smooth as possible.

Jobs or Tasks as the Unit of Work

The current project started out to learn about the process of test validation, but while achieving this objective, it has further opened the conception of the "world of work". The traditional unit for describing work has been the job. We work on a job, get paid for a job, have job training, study job families, organize the DOT by jobs, validate tests for jobs, etc. The "job" has seemed to be the best unit for dealing with the sphere of work.

Yet we know there is great variation in what is done on jobs with the same title. All persons with the title of secretary, welder, or house painter do not do the same work.

- they don't get paid the same
- their training is different
- jobs change very rapidly by the addition, subtraction and modification of tasks.

But personnel systems have struggled to persist in the illusion of the job as a stable unit. On the other hand, we know that:

- a task is a more homogeneous unit than a job
- a task is a more meaningful unit to describe work
- a task would be a better guide for pay purposes
- training can be more accurately tied to task modules rather than on whole jobs
- job restructuring depends on task information
- job analysis is really task analysis
- as our culture has become more specialized, a more detailed level of work description is needed.

There would thus seem to be major advantages of utilizing tasks as a basic unit in thinking about work. Some specific examples may be cited where an organization of tasks might be more useful than a classification of jobs.

1. The Center for Occupational Education, North Carolina State University, has been doing some monumental work on developing an inventory of occupations. Their same approach might have been applied to tasks with much greater reliability of description, more valid judgments about work, and classification of work.
2. The American Institutes for Research is developing career guidance programs and curricula for providing work information. The structure of these activities would be different if they were task-oriented rather than job-oriented. Career ladders and curricula would be organized quite differently.
3. Samuel Cleff, Personnel Data Systems, has developed an interesting methodology for developing a job/man matching system. How much more accurate the matching would be if tasks were the unit of analysis.

Further study should be given to:

- the pros and cons of using tasks as the unit of description
- the purposes or uses for which task data would be more effective and where job data would be more effective
- formulating criteria by which effectiveness would be judged
- locating and examining currently developed task classification systems
- formulating criteria by which any task classification system should be evaluated
- developing a set of recommendations regarding -
    a. future utilization of task data
    b. the next steps in developing a task-oriented system.

Relevant Work Opportunities for Low Literacy Persons

In a recent study completed for the Office of Education, it was reported that 20% of the U.S. adult population was functionally illiterate. This group was unable to perform accurately simple tasks needed in everyday life (e.g. addressing an envelope). This has serious implications on the ability of such persons to find employment. In the present study the low literacy group was able to perform the lowest level tasks with a fairly low level of errors (3% to 7%), but more and more of such work is being computerized. The group's errors at the next level of task difficulty (i.e. responding to three task characteristics) are very high. Unless special methods and attention are directed in school to coping with this kind of task, persons with literacy problems will have serious employment problems. Their need is not simply for word and mathematics knowledge but for skill in dealing with information processing tasks. It is encouraging to find that some attention has been devoted to this problem. Bereiter and Engelmann have described certain of the reasoning difficulties in "Teaching Disadvantaged Children in the Preschool" while Bloom and Broder have shown that low-aptitude persons performed much more effectively at the college level after special training in classification skills. This kind of research is essential to find ways of preparing such persons to compete for employment.

CONCLUSIONS

1. A new taxonomy for describing information-handling tasks is proposed. This system applies to a wide range of clerical, administrative, and technical work, covering many hundreds of jobs. A grouping of tasks, called a task cluster, was identified which in each case has three elements that function together:

   a. tasks relating to the receipt of the information (input)
   b. tasks relating to how the information is manipulated
   c. tasks relating to the method of output.

2. A means of developing cluster performance measures (CPM's) was demonstrated. Objective, reliable criterion measures of task output were obtained.

3. The CPM's were utilized in a validation study to examine the predictiveness of the Basic Occupational Literacy Test among groups of Whites, Negroes, American Indians, and Spanish-heritage, males and females. Validity coefficients averaging above .40 were obtained. Arithmetic Computation generally was more predictive then other BOLT subtests.

4. Differences in validity coefficients among ethnic/racial and sex groups were at the chance level. A few differences in slopes and intercepts beyond the chance level were obtained. There was no evidence that BOLT was unfair to minority groups in predicting task performance.

5. The interpretation of data concerning test unfairness was considerably altered by the removal of highly deviate cases which concealed the basic relationships within the results. Scientific procedures need to be developed to determine in advance the rules for the exclusion of such cases.

6. The study demonstrated the feasibility of validating predictors against a criterion of objective task measures rather than a total job criteria. This validation strategy offers major economies over conventional job-by-job validation studies.

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INTERCORRELATIONS OF BOLT SUBTESTS

	Arithmetic Computation	Arithmetic Reasoning	Reading Vocabulary
Arithmetic Computation			
Arithmetic Reasoning	r = .64 N = 1,244		
Reading Vocabulary	r = .45 N = 463	r = .59 N = 445	
Reading Comprehension	r = .50 N = 462	r = .61 N = 444	r = .70 N = 1,277

Correlational Data on the Prediction of Cluster Performance Measures in Various Ethnic/Racial Groups by BOLT Subtest - Arithmetic Computation

	Number				Correlations				Intercepts				Slopes			
Cluster Performance Measure	N	I	W	S	N	I	W	S	N	I	W	S	N	I	W	S
Checking Applications	98	116	94	106	.28	.50	.59	.35	31.6	20.3	27.2	31.9	.073	.176	.114	.076
Comparing Addresses	91	34	117	59	.47	.53	.52	.45	52.0	43.4	55.1	56.6	.158	.250	.138	.137
Comparing Telephone Information	97	70	101	92	.50	.32	.60	.65	12.0	23.9	7.3	-8.0	.258	.153	.283	.412
Copying Telephone Information	97	70	100	94	.44	.37	.54	.56	207.8	392.4	170.0	49.2	3.18	1.70	3.30	4.34
Classifying Appliance Dealers	84	81	122	80	.60	.50	.29	.36	17.9	25.3	47.3	41.8	.326	.274	.078	.123
Alphabetizing Appliance Dealers	72	69	117	72	.35	.37	.30	.35	40.0	49.3	52.4	47.1	.137	.060	.036	.076
Coding Application Data	98	116	95	106	.29	.42	.49	.37	50.6	43.5	45.0	52.6	.142	.210	.187	.131
Copying Application Data	98	117	95	106	.18	.38	.45	.38	196.4	151.3	165.0	186.4	.215	.603	.456	.305
Copying Housing Qualifications	98	116	95	106	.25	.47	.42	.45	35.8	25.9	29.7	30.2	.066	.157	.114	.118
Classifying Housing Qualifications	98	116	95	106	.41	.59	.49	.46	20.0	6.1	14.6	21.6	.183	.294	.218	.172
Locating and Classifying Zip Codes	81	76	135	77	.59	.51	.29	.49	7.6	12.0	25.9	14.7	.214	.186	.062	.152
Locating Personnel Information	98	52	94	89	.57	.57	.67	.58	-1.1	-3.8	-3.8	-2.8	.082	.094	.110	.095
Calculating Postage Charges	103	49	102	88	.71	.62	.63	.61	-7.1	2.2	18.4	15.9	.513	.434	.298	.334

Numbers, Means, and Variability of Ethnic/Racial Groups on
Cluster Performance Measures and BOLT Subtest - Arithmetic Computation

Cluster Performance Measure	Number				CPM								BOLT - STANDARD SCORE							
					Means				Std. devs.				Means				Std. devs.			
	N	I	W	S	N	I	W	S	N	I	W	S	N	I	W	S	N	I	W	S
Checking Applications	98	116	94	106	39.3	38.9	40.7	40.4	4.9	7.3	3.8	4.6	105.3	105.5	118.5	111.4	19.2	20.6	19.7	20.9
Comparing Addresses	91	84	117	59	68.4	69.0	71.3	71.6	7.5	10.3	5.2	6.2	104.2	102.1	117.7	109.6	22.2	21.5	19.7	20.4
Comparing Telephone Information	97	70	101	92	37.3	40.5	40.5	36.0	11.0	9.7	9.6	12.8	98.1	107.8	117.4	106.8	21.1	20.4	20.3	20.0
Copying Telephone Information	97	70	100	94	520.1	575.5	558.0	511.7	152.6	93.7	122.2	159.6	98.1	107.8	117.7	106.4	21.1	20.4	20.2	20.5
Classifying Appliance Dealers	84	81	122	89	52.0	53.4	56.4	55.5	11.8	11.7	5.3	6.5	104.8	102.3	116.9	111.0	21.6	21.3	19.4	18.9
Alphabetizing Appliance Dealers	72	69	117	72	55.1	55.8	56.8	55.8	7.3	2.9	2.3	3.8	109.8	107.5	118.3	113.8	18.6	17.9	18.5	17.6
Coding Application Data	98	116	95	106	65.6	65.7	67.1	67.2	9.3	10.2	7.7	7.4	105.7	105.5	118.0	111.4	19.3	20.6	20.1	20.9
Copying Application Data	98	117	95	106	219.0	214.6	218.8	220.3	23.2	33.2	20.3	16.8	105.3	105.1	118.0	111.4	19.2	21.0	20.1	20.9
Copying Housing Qualifications	98	116	95	106	42.7	42.3	43.3	43.3	5.1	6.9	5.4	5.4	105.3	104.8	118.0	111.4	19.2	20.6	20.1	20.9
Classifying Housing Qualifications	98	116	95	106	39.3	37.0	40.3	40.8	8.5	10.4	9.0	7.8	105.3	104.8	118.0	111.4	19.2	20.6	20.1	20.9
Locating and Classifying Zip Codes	81	76	135	77	29.8	31.3	33.2	31.6	7.8	7.7	4.4	5.9	103.5	103.1	117.3	111.2	21.4	21.2	20.2	19.1
Locating Personnel Information	98	52	94	89	7.4	6.3	9.2	7.9	3.1	3.4	3.4	3.2	105.4	106.4	117.8	113.1	21.8	20.6	20.3	19.7
Calculating Postage Charges	103	49	102	88	46.9	48.2	53.9	53.9	15.9	14.5	9.8	10.7	105.0	105.8	119.1	113.7	21.9	21.0	20.8	19.5

Performance and Correlational Data for Males and Females in the
Prediction of Cluster Performance Measures by BOLT Subtest - Arithmetic Computation

			CPM				BOLT									
	Number		Means		Std.Devs.		Means		Std.Devs.		Correlations		Intercepts		Slopes	
Cluster Performance Measure	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Checking Applications	199	215	39.3	40.2	6.0	4.9	109.1	110.7	21.8	19.8	.44	.43	26.1	28.6	.121	.105
Comparing Addresses	174	177	69.3	70.8	8.3	6.6	106.9	111.2	22.6	20.9	.50	.49	49.6	53.4	.183	.156
Comparing Telephone Information	171	188	36.2	40.7	11.5	10.0	106.6	108.7	21.1	22.0	.53	.53	5.1	14.1	.291	.244
Copying Telephone Information	171	189	512.6	564.3	149.5	122.8	106.7	108.5	21.1	22.2	.49	.48	139.0	274.8	3.5	2.67
Classifying Appliance Dealers	179	188	53.8	55.3	10.0	8.1	107.7	111.5	21.8	20.1	.48	.45	30.1	34.8	.220	.184
Alphabetizing Appliance Dealers	153	177	55.4	56.5	5.7	2.5	112.4	113.9	19.4	17.9	.35	.33	43.9	51.3	.101	.046
Coding Application Data	199	214	65.6	67.4	9.8	7.1	109.1	110.8	21.8	19.8	.39	.40	46.4	51.3	.175	.145
Copying Application Data	200	215	215.6	221.0	29.0	17.4	108.8	110.7	22.0	19.8	.36	.28	163.3	193.9	.480	.245
Copying Housing Qualifications	200	215	42.1	43.6	7.0	4.3	108.8	110.4	22.0	19.8	.43	.38	26.9	34.5	.139	.082
Classifying Housing Qualifications	200	215	38.7	39.8	10.3	7.9	108.8	110.4	22.0	19.8	.51	.48	12.4	18.5	.241	.192
Locating and Classifying Zip Codes	177	192	30.4	33.0	8.1	4.0	107.2	112.7	22.3	20.1	.53	.41	9.7	23.6	.192	.083
Locating Personnel Information	202	131	8.2	7.5	3.4	3.4	109.9	113.0	21.4	20.8	.66	.57	-3.5	-2.8	.106	.091
Calculating Postage Charges	203	139	50.1	52.3	13.9	12.0	109.1	115.2	21.6	21.1	.68	.63	2.2	10.6	.438	.361

Correlational Data on the Prediction of Cluster Performance Measures in Various Ethnic/Racial Groups by BOLT Subtest - Arithmetic Reasoning

	Number				Correlations				Intercepts				Slopes			
Cluster Performance Measure	N	I	W	S	N	I	W	S	N	I	W	S	N	I	W	S
Checking Applications	98	105	94	104	.24	.32	.50	.29	33.4	26.4	29.0	33.1	.061	.127	.102	.070
Comparing Addresses	87	84	117	59	.21	.44	.38	.30	60.6	42.3	59.6	60.3	.076	.275	.103	.110
Comparing Telephone Information	94	70	102	92	.44	.09	.51	.54	13.1	36.3	7.5	-2.3	.251	.043	.290	.382
Copying Telephone Information	94	70	101	94	.39	.14	.51	.46	213.7	513.3	138.0	110.9	3.17	.630	3.70	4.01
Classifying Appliance Dealers	84	81	122	80	.57	.50	.26	.23	19.5	18.9	48.2	46.7	.318	.355	.073	.085
Alphabetizing Appliance Dealers	71	69	117	72	.36	.45	.11	.20	40.2	47.2	55.2	51.2	.140	.087	.013	.044
Coding Application Data	98	105	95	104	.28	.18	.36	.36	52.7	55.7	50.3	52.3	.135	.101	.147	.142
Copying Application Data	98	106	95	104	.13	.21	.27	.22	203.9	177.5	185.3	200.2	.157	.378	.293	.191
Copying Housing Qualifications	98	105	95	104	.27	.38	.45	.43	35.8	28.2	28.5	30.3	.072	.144	.129	.123
Classifying Housing Qualifications	98	105	95	104	.44	.54	.59	.55	20.6	7.1	8.1	17.1	.194	.306	.282	.225
Locating and Classifying Zip Codes	81	76	135	77	.58	.46	.20	.38	8.5	9.6	27.6	18.5	.208	.223	.049	.127
Locating Personnel Information	99	51	95	84	.61	.67	.67	.63	-2.1	-6.4	-3.7	-3.1	.096	.138	.112	.102
Calculating Postage Charges	104	48	103	83	.67	.56	.64	.57	-6.0	4.0	14.1	18.5	.528	.494	.342	.321

Numbers, Means, and Variability of Ethnic/Racial Groups on Cluster Performance Measures and BOLT Subtest - Arithmetic Reasoning

					CPM								BOLT - STANDARD SCORE							
	Number				Means				Std. devs.				Means				Std. devs.			
Cluster Performance Measure	N	I	W	S	N	I	W	S	N	I	W	S	N	I	W	S	N	I	W	S
Checking Applications	98	105	94	104	39.3	38.6	40.7	40.4	4.9	7.5	3.8	4.6	96.0	96.5	114.4	105.2	19.3	19.1	18.8	19.2
Comparing Addresses	87	84	117	59	68.2	69.0	71.3	71.6	7.7	10.3	5.2	6.2	101.0	97.1	113.5	101.9	21.6	16.3	19.2	17.2
Comparing Telephone Information	94	70	102	92	37.2	40.5	40.6	36.0	10.9	9.7	9.6	12.8	96.3	98.8	114.0	100.0	19.1	20.9	16.7	18.2
Copying Telephone Information	94	70	101	94	518.0	575.5	558.7	511.7	153.2	93.7	121.8	159.6	96.3	98.8	114.1	99.9	19.1	20.9	16.7	18.2
Classifying Appliance Dealers	84	81	122	80	51.7	53.4	56.4	55.5	12.0	11.7	5.3	6.5	101.4	97.1	113.0	103.3	21.5	16.5	19.1	17.6
Alphabetizing Appliance Dealers	71	69	117	72	55.1	55.8	56.8	55.8	7.3	2.9	2.3	3.8	106.7	99.9	114.1	104.5	18.6	15.3	18.6	17.5
Coding Application Data	98	105	95	104	65.6	65.4	67.1	67.2	9.3	10.7	7.7	7.5	96.0	96.5	114.2	105.2	19.2	19.1	18.9	19.2
Copying Application Data	98	106	95	104	219.0	213.8	218.8	220.3	23.2	34.8	20.3	16.9	96.1	96.1	114.2	105.2	19.3	19.3	18.9	19.2
Copying Housing Qualifications	98	105	95	104	42.7	42.0	43.3	43.2	5.1	7.2	5.4	5.5	98.0	95.7	114.2	105.2	19.3	18.9	18.9	19.2
Classifying Housing Qualifications	98	105	95	104	39.3	36.4	40.3	40.8	8.5	10.6	9.0	7.9	96.0	95.7	114.2	105.2	19.3	18.9	18.9	19.2
Locating and Classifying Zip Codes	81	76	135	77	29.8	31.3	33.2	31.6	7.8	7.7	4.4	5.9	102.4	97.2	113.8	103.5	21.7	15.8	18.1	17.7
Locating Personnel Information	99	51	95	84	7.5	6.3	9.2	8.1	3.1	3.5	3.4	3.2	100.6	91.9	114.7	109.0	19.9	16.8	20.2	19.8
Calculating Postage Charges	104	48	103	83	47.0	48.6	53.7	53.6	15.9	14.3	10.0	11.0	100.5	90.5	115.8	109.6	20.2	16.1	18.8	19.6

Performance and Correlational Data for Males and Females in the Prediction of Cluster Performance Measures by BOLT Subtest - Arithmetic Reasoning

			CPM				BOLT									
	Number		Means		Std.Devs.		Means		Std.Devs.		Correlations		Intercepts		Slopes	
Cluster Performance Measure	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Checking Applications	199	203	39.3	40.1	6.0	5.0	105.3	100.3	21.3	19.2	.38	.32	28.2	31.7	.106	.084
Comparing Addresses	170	177	69.2	70.8	8.4	6.7	104.9	104.0	21.4	18.5	.36	.33	54.6	58.6	.140	.118
Comparing Telephone Information	174	183	36.0	40.9	11.6	9.8	103.5	102.2	19.0	20.7	.48	.40	5.9	21.5	.290	.190
Copying Telephone Information	174	184	511.0	566.7	150.6	119.9	103.5	102.1	19.0	20.7	.41	.41	172.8	326.7	3.27	2.35
Classifying Appliance Dealers	179	188	53.8	55.1	10.0	8.4	105.7	103.7	21.0	18.6	.49	.36	29.0	38.2	.234	.162
Alphabetizing Appliance Dealers	153	176	55.4	56.6	5.7	2.5	109.5	105.6	19.4	17.5	.35	.20	44.0	53.6	.103	.028
Coding Application Data	199	201	65.6	67.3	9.8	7.3	105.3	100.2	21.3	19.2	.33	.30	49.7	56.0	.150	.113
Copying Application Data	200	202	215.6	220.9	29.0	17.9	105.1	100.4	21.5	19.2	.26	.14	178.8	207.4	.349	.135
Copying Housing Qualifications	200	202	42.1	43.5	7.0	4.4	105.1	100.1	21.5	19.0	.43	.34	27.0	35.5	.142	.080
Classifying Housing Qualifications	200	202	38.7	39.6	10.3	8.0	105.1	100.1	21.5	19.0	.58	.49	9.6	18.7	.277	.206
Locating and Classifying Zip Codes	176	193	30.4	33.0	8.1	4.0	106.2	105.3	20.6	18.5	.54	.29	7.8	26.3	.212	.062
Locating Personnel Information	202	127	8.2	7.6	3.4	3.4	107.9	101.6	21.6	19.5	.69	.62	-3.6	-3.4	.110	.109
Calculating Postage Charges	202	136	50.1	52.1	13.9	12.1	107.5	103.8	21.8	19.4	.64	.61	5.8	12.2	.411	.384

Correlational Data on the Prediction of Cluster Performance Measures in Various Ethnic/Racial Groups by BOLT Subtest - Reading Vocabulary

	Number				Correlations				Intercepts				Slopes			
Cluster Performance Measure	N	I	W	S	N	I	W	S	N	I	W	S	N	I	W	S
Checking Applications	108	117	91	98	.32	.21	.39	.18	27.2	30.4	32.6	37.0	.113	.086	.072	.034
Comparing Addresses	67	87	112	88	.29	.42	.18	.29	52.0	42.0	64.9	62.1	.150	.258	.060	.092
Comparing Telephone Information	95	80	90	105	.40	.00	.50	.50	10.6	40.5	10.1	.713	.245	.000	.270	.345
Copying Telephone Information	94	80	89	107	.33	.02	.47	.44	256.6	576.0	210.6	111.8	2.5	.090	.319	3.844
Classifying Appliance Dealers	68	85	113	110	.40	.49	.26	.22	35.6	31.2	44.0	48.9	.181	.226	.102	.069
Alphabetizing Appliance Dealers	64	76	108	107	.46	.10	.15	.35	48.0	54.0	53.8	47.1	.073	.018	.023	.083
Coding Application Data	107	117	91	98	.39	.14	.32	.27	39.6	57.8	57.0	58.1	.238	.081	.090	.095
Copying Application Data	108	118	91	98	.35	.25	.33	.22	153.8	168.1	196.6	198.2	.577	.462	.206	.217
Copying Housing Qualifications	108	117	91	98	.42	.42	.55	.33	27.1	26.9	32.8	34.8	.144	.153	.098	.084
Classifying Housing Qualifications	108	117	91	98	.49	.55	.45	.38	13.8	4.6	22.8	29.2	.241	.317	.165	.121
Locating and Classifying Zip Codes	65	80	108	107	.47	.46	.22	.30	16.4	11.3	25.9	24.8	.148	.191	.060	.077
Locating Personnel Information	87	51	92	96	.47	.47	.59	.61	.742	-1.5	-4.0	-2.8	.062	.091	.109	.102
Calculating Postage Charges	88	47	102	93	.48	.41	.42	.48	7.2	21.9	23.4	20.9	.359	.279	.254	.310

Numbers, Means, and Variability of Ethnic/Racial Groups on Cluster Performance Measures and BOLT Subtest - Reading Vocabulary

					CPM								BOLT - STANDARD SCORE							
	Number				Means				Std. devs.				Means				Std. devs.			
Cluster Performance Measure	N	I	W	S	N	I	W	S	N	I	W	S	N	I	W	S	N	I	W	S
Checking Applications	108	117	91	98	38.6	39.3	41.0	40.5	7.3	6.8	3.6	3.8	100.6	103.1	117.1	101.4	20.9	17.2	19.4	19.8
Comparing Addresses	67	87	112	88	67.4	69.1	71.9	71.8	10.5	10.3	5.3	5.7	101.9	105.0	116.1	105.0	20.3	17.0	16.1	18.3
Comparing Telephone Information	95	80	90	105	35.8	40.6	40.1	33.8	11.6	8.0	10.0	13.7	102.6	104.7	110.9	100.1	18.8	18.7	18.3	19.9
Copying Telephone Information	94	80	89	107	514.6	585.5	564.9	495.2	142.0	77.8	124.5	170.0	102.9	104.7	110.9	99.8	18.6	18.7	18.4	19.8
Classifying Appliance Dealers	68	85	113	110	54.1	55.1	56.0	56.3	9.1	7.9	6.1	5.2	102.3	105.3	117.7	107.5	20.3	17.0	15.6	17.0
Alphabetizing Appliance Dealers	64	76	108	107	55.7	56.0	56.7	56.1	3.1	2.8	2.4	4.0	104.1	108.1	118.5	107.9	19.5	14.9	14.8	16.9
Coding Application Data	107	117	91	98	63.6	66.1	67.6	67.8	12.9	9.9	5.6	6.8	100.8	103.1	117.1	101.4	20.9	17.2	19.4	19.8
Copying Application Data	108	118	91	98	211.9	215.5	220.7	220.2	34.1	31.8	12.2	18.7	100.6	102.7	117.1	101.4	20.9	17.5	19.4	19.8
Copying Housing Qualifications	108	117	91	98	41.7	42.7	44.3	43.4	7.1	6.3	3.5	5.0	100.6	102.5	117.1	101.4	20.9	17.4	19.4	19.8
Classifying Housing Qualifications	108	117	92	98	38.0	37.1	42.1	41.6	10.4	9.9	7.2	6.4	100.6	102.5	117.1	101.4	20.9	17.4	19.4	19.8
Locating and Classifying Zip Codes	65	80	108	107	31.5	31.5	33.1	33.0	6.3	7.2	4.1	4.3	102.5	105.3	118.9	107.4	20.4	17.4	15.0	17.4
Locating Personnel Information	87	51	92	96	7.2	8.0	8.7	7.7	3.1	3.4	3.4	3.6	103.5	105.8	116.3	102.2	23.1	17.5	18.5	19.9
Calculating Postage Charges	88	47	102	93	44.5	51.6	53.3	52.7	17.3	12.3	10.3	12.7	103.7	106.0	117.3	102.6	23.0	18.2	17.2	19.7

Performance and Correlational Data for Males and Females in the Prediction of Cluster Performance Measures by BOLT Subtest - Reading Vocabulary

			CPM				BOLT									
	Number		Means		Std.Devs.		Means		Std.Devs.		Correlations		Intercepts		Slopes	
Cluster Performance Measure	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Checking Applications	202	212	38.9	40.6	6.9	4.5	104.8	105.4	21.5	19.2	.32	.22	28.1	35.1	.104	.052
Comparing Addresses	192	162	69.2	71.6	8.9	6.9	108.6	107.1	19.8	17.0	.38	.26	50.5	60.3	.172	.104
Comparing Telephone Information	186	184	35.5	39.1	12.0	10.9	104.3	104.4	19.6	19.1	.46	.37	6.4	17.1	.279	.211
Copying Telephone Information	185	185	516.4	556.4	149.5	128.0	104.4	104.3	19.6	19.1	.40	.37	200.3	297.9	3.0	2.4
Classifying Appliance Dealers	202	174	55.6	55.5	6.3	7.7	109.6	108.6	19.4	16.7	.37	.34	42.4	38.4	.120	.156
Alphabetizing Appliance Dealers	191	164	55.8	56.6	3.6	2.6	111.0	109.9	18.5	15.6	.35	.23	48.4	52.3	.067	.038
Coding Application Data	202	211	64.8	67.5	11.3	7.3	104.8	105.6	21.5	19.1	.33	.21	46.4	59.1	.176	.080
Copying Application Data	203	212	212.9	220.6	32.9	18.3	104.6	105.4	21.6	19.2	.35	.18	156.7	202.6	.537	.170
Copying Housing Qualifications	203	211	42.0	43.9	7.2	3.7	104.6	105.3	21.6	19.1	.44	.43	26.4	34.9	.148	.085
Classifying Housing Qualifications	203	211	38.2	40.8	10.4	7.2	104.6	105.3	21.6	19.1	.50	.45	12.9	22.8	.242	.170
Locating and Classifying Zip Codes	191	169	31.9	33.1	6.2	4.3	108.9	110.1	19.6	16.9	.38	.39	18.6	22.2	.121	.099
Locating Personnel Information	198	128	8.0	7.7	3.4	3.3	107.2	106.8	22.0	19.1	.57	.51	-1.4	-1.8	.088	.089
Calculating Postage Charges	195	135	49.2	52.4	14.4	12.7	107.3	108.8	21.9	18.7	.51	.34	12.4	27.0	.342	.233

Correlational Data on the Prediction of Cluster Performance Measures in
Various Ethnic/Racial Groups by BOLT Subtest - Reading Comprehension

	Number				Correlations				Intercepts				Slopes			
Cluster Performance Measure	N	I	W	S	N	I	W	S	N	I	W	S	N	I	W	S
Checking Applications	108	117	91	98	.39	.29	.36	.30	23.2	28.9	33.9	34.0	.146	.103	.061	.060
Comparing Addresses	67	87	112	88	.23	.52	.24	.35	53.3	39.8	64.3	60.3	.130	.281	.065	.108
Comparing Telephone Information	95	80	91	105	.53	.14	.54	.69	3.1	34.0	12.0	-16.1	.316	.063	.251	.497
Copying Telephone Information	94	80	90	107	.42	.06	.48	.59	189.4	558.5	249.8	-42.0	3.1	.259	2.8	5.3
Classifying Appliance Dealers	68	85	113	110	.44	.44	.26	.25	31.7	36.2	46.5	48.4	.216	.180	.080	.072
Alphabetizing Appliance Dealers	64	76	108	107	.34	.28	.24	.19	49.2	51.1	52.9	51.6	.061	.044	.031	.041
Coding Application Data	107	117	92	98	.42	.28	.36	.27	34.4	51.5	53.4	57.4	.276	.145	.118	.098
Copying Application Data	108	118	92	98	.35	.30	.27	.18	147.2	165.3	193.4	201.2	.611	.500	.222	.179
Copying Housing Qualifications	108	117	92	98	.45	.47	.49	.31	24.4	27.1	34.9	34.5	.163	.155	.080	.083
Classifying Housing Qualifications	108	117	92	98	.53	.59	.60	.45	8.0	6.1	18.6	25.3	.283	.309	.201	.152
Locating and Classifying Zip Codes	65	80	108	107	.48	.39	.28	.37	15.0	16.4	26.6	23.5	.159	.144	.056	.087
Locating Personnel Information	87	51	92	95	.56	.46	.52	.52	-.7	-1.4	-1.5	-1.2	.076	.089	.089	.083
Calculating Postage Charges	88	47	102	92	.56	.43	.50	.49	-2.1	18.7	21.8	20.7	.444	.310	.271	.299

Numbers, Means, and Variability of Ethnic/Racial Groups on
Cluster Performance Measures and BOLT Subtest - Reading Comprehension

					CPM								BOLT - STANDARD SCORE							
	Number				Means				Std. devs.				Means				Std. devs.			
Cluster Performance Measure	N	I	W	S	N	I	W	S	N	I	W	S	N	I	W	S	N	I	W	S
Checking Applications	108	117	91	98	38.6	39.3	41.0	40.6	7.3	6.8	3.6	3.8	105.6	100.7	116.2	106.3	19.7	18.9	21.4	19.0
Comparing Addresses	67	87	112	88	67.4	69.1	71.9	71.8	10.5	10.3	5.3	5.7	103.9	104.2	115.8	106.1	18.9	19.3	20.4	18.8
Comparing Telephone Information	95	80	91	105	35.8	40.6	39.9	33.8	11.6	8.0	10.1	13.7	103.5	104.0	110.8	100.7	19.3	18.3	21.9	19.0
Copying Telephone Information	94	80	90	107	514.6	585.5	562.1	495.2	142.0	77.8	126.5	170.0	103.8	104.0	111.1	100.5	19.2	18.3	21.8	18.9
Classifying Appliance Dealers	68	85	113	110	54.1	55.1	56.0	56.3	9.1	7.9	6.1	5.2	103.9	104.1	117.1	108.5	18.8	19.5	19.5	18.2
Alphabetizing Appliance Dealers	64	76	108	107	55.7	56.0	56.7	56.1	3.1	2.8	2.4	4.0	105.8	107.2	118.3	108.8	17.6	17.8	18.8	18.0
Coding Application Data	107	117	92	98	63.6	66.1	67.2	67.9	12.9	9.9	7.0	6.8	105.8	100.7	115.9	106.3	19.7	18.9	21.4	19.0
Copying Application Data	108	118	92	98	211.9	215.5	219.3	220.2	34.1	31.8	18.0	18.7	105.6	100.4	115.9	106.3	19.7	19.2	21.4	19.0
Copying Housing Qualifications	108	117	92	98	41.7	42.7	44.2	43.4	7.1	6.3	3.5	5.0	105.6	100.2	115.9	106.3	19.7	19.1	21.4	19.0
Classifying Housing Qualifications	108	117	92	98	38.0	37.1	42.0	41.6	10.4	9.9	7.2	6.4	105.6	100.2	115.9	106.3	19.7	19.1	21.4	19.0
Locating and Classifying Zip Codes	65	80	108	107	31.5	31.5	33.1	33.0	6.3	7.2	4.1	4.3	104.1	104.4	115.9	108.9	19.0	19.4	20.4	18.3
Locating Personnel Information	87	51	92	95	7.2	8.0	8.7	7.6	3.1	3.4	3.4	3.4	104.4	106.3	114.8	106.5	22.3	17.4	20.4	21.0
Calculating Postage Charges	88	47	102	92	44.5	51.6	53.3	52.6	17.3	12.3	10.2	12.7	104.9	106.0	116.0	106.8	22.0	17.3	19.2	21.1

Performance and Correlational Data for Males and Females in the Prediction of ClusterPerformance Measures by BOLT Subtest - Reading Comprehension

			CPM				BOLT									
	Number		Means		Std.Devs.		Means		Std.Devs.		Correlations		Intercepts		Slopes	
Cluster Performance Measure	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Checking Applications	202	213	38.9	40.6	6.9	4.5	105.6	107.7	21.2	19.6	.35	.31	26.8	32.8	.115	.072
Comparing Addresses	192	162	69.2	71.6	8.9	6.9	109.1	107.4	19.9	20.3	.41	.31	49.0	60.0	.185	.107
Comparing Telephone Information	186	185	35.5	39.1	12.0	10.9	103.7	105.5	19.4	20.6	.55	.51	.450	10.4	.338	.271
Copying Telephone Information	185	186	516.4	555.1	149.5	128.8	103.9	105.4	19.2	20.6	.45	.46	155.9	250.9	3.4	2.8
Classifying Appliance Dealers	202	174	55.6	55.5	6.3	7.7	109.8	108.6	19.6	19.8	.40	.31	41.7	42.3	.126	.121
Alphabetizing Appliance Dealers	191	164	55.8	56.6	3.6	2.6	111.4	110.2	18.6	19.0	.27	.28	50.0	52.4	.051	.037
Coding Application Data	202	211	64.8	67.7	11.3	7.3	105.6	107.9	21.2	19.6	.35	.29	45.0	56.0	.188	.106
Copying Application Data	203	212	212.9	220.6	32.9	18.3	105.4	107.8	21.3	19.6	.31	.23	162.2	196.9	.480	.220
Copying Housing Qualifications	203	212	42.0	43.9	7.2	3.7	105.4	107.6	21.3	19.6	.42	.48	26.9	34.0	.143	.091
Classifying Housing Qualifications	203	212	38.2	40.7	10.4	7.2	105.4	107.6	21.3	19.6	.57	.54	8.5	19.2	.281	.199
Locating and Classifying Zip Codes	191	169	31.9	33.1	6.2	4.3	108.8	109.5	19.8	20.0	.40	.35	17.8	24.8	.129	.076
Locating Personnel Information	198	127	8.0	7.7	3.4	3.3	108.1	108.5	21.4	20.5	.58	.46	-1.8	-.422	.091	.074
Calculating Postage Charges	195	134	49.2	52.3	14.4	12.8	107.8	110.8	21.0	20.2	.60	.36	4.4	27.0	.415	.228

SIGNIFICANT DIFFERENCES WITHIN CPM'S

The following tables present for each CPM the results of tests of significance of difference between group means on BOLT subtests (predictor - P), CPM group means (criterion - C), correlation coefficients (r), intercepts (I), and slopes (S). Comparisons are made of White results with Negro results (W•N), Indian results (W•I) and Spanish results (W•S). The Male - Female differences are described under M•F.

The data are coded as follows:

P 1. the mean score on the predictor (AC, AR, RV and RC)

(If the White or Male mean is significantly higher, an H is shown. If significantly lower, an L is shown. If not significantly different, an S is shown. An asterisk is placed above the H or L to indicate a t value that was between the 1% and 5% levels of significance.)

C 2. the mean performance on the particular CPM

(see note above on the use of H, L, and S)

r 3. the correlation coefficients

(a D is inserted if the pair of correlations are significantly different from each other.

I 4. the intercepts

(a D is inserted if the intercepts for the groups are significantly different, the asterisk above the D showing a difference between 1% and 5% levels of significance.)

S 5. the slopes

(see note for intercepts)

To illustrate, in the first table for the CPM, Checking Applications, the data for Arithmetic Computation (AC) for the comparison of White and Negro results, shows H $\overset{*}{\text{H}}$ D S S. This is interpreted as follows:

1. the first H means that the mean for the White group on AC was significantly higher than the mean for the Negro group at the 1% level.

2. the second, $\overset{*}{H}$, shows that the mean for the White group on Checking Applications was significantly higher than the mean for the Negro group at the 5% level.
3. the D means that the correlation between AC and Checking Applications were significantly different.
4. the first S means that the intercepts of the White and Negro regression equations were not significantly different.
5. the second S means that the slopes of the regression equations were not significantly different.

Checking Applications

	W•N	W•I	W•S	M•F
	P C r I S	P C r I S	P C r I S	P C r I S
AC	H $\overset{*}{H}$ D S S	H $\overset{*}{H}$ S S S	H S S S S	S S S S S
AR	H $\overset{*}{H}$ $\overset{*}{D}$ S S	H $\overset{*}{H}$ S S S	H S S S S	$\overset{*}{H}$ S S S S
RV	H H S S S	H $\overset{*}{H}$ S S S	H S S S S	S L S $\overset{*}{D}$ $\overset{*}{D}$
RC	H H S D $\overset{*}{D}$	H H S S S	H S S S S	S L S $\overset{*}{D}$ S

Comparing Addresses

	W•N					W•I					W•S					M•F				
	P	C	r	I	S	P	C	r	I	S	P	C	r	I	S	P	C	r	I	S
AC	H	H	S	S	S	H	S	S	$\overset{*}{D}$	$\overset{*}{D}$	$\overset{*}{H}$	S	S	S	S	S	S	S	S	S
AR	H	H	S	S	S	H	S	S	D	D	H	S	S	S	S	S	S	S	S	S
RV	H	H	S	S	S	H	H	S	D	D	H	S	S	S	S	S	L	S	S	S
RC	H	H	S	S	S	H	$\overset{*}{H}$	$\overset{*}{D}$	D	D	H	S	S	S	S	S	L	S	$\overset{*}{D}$	$\overset{*}{D}$

Comparing Telephone Information

	W•N					W•I					W•S					M•F				
	P	C	r	I	S	P	C	r	I	S	P	C	r	I	S	P	C	r	I	S
AC	H	$\overset{*}{H}$	S	S	S	H	S	$\overset{*}{D}$	$\overset{*}{D}$	$\overset{*}{D}$	H	H	S	$\overset{*}{D}$	$\overset{*}{D}$	S	L	S	S	S
AR	H	$\overset{*}{H}$	S	S	S	H	S	D	D	D	H	H	S	S	S	S	L	S	D	S
RV	H	H	S	S	S	$\overset{*}{H}$	S	D	D	D	H	H	S	S	S	S	L	S	S	S
RC	$\overset{*}{H}$	$\overset{*}{H}$	S	S	S	$\overset{*}{H}$	S	D	D	D	H	H	S	D	D	S	L	S	S	S

Copying Telephone Information

	W•N	W•I	W•S	M•F
	P C r I S	P C r I S	P C r I S	P C r I S
AC	H S S S S	H S S D $\overset{*}{D}$	H $\overset{*}{H}$ S S S	S L S $\overset{*}{D}$ S
AR	H $\overset{*}{H}$ S S S	H $\overset{*}{L}$ D D D	H $\overset{*}{H}$ S S S	S L S $\overset{*}{D}$ S
RV	H $\overset{*}{H}$ S S S	$\overset{*}{H}$ S D D D	H H S S S	S L S S S
RC	$\overset{*}{H}$ $\overset{*}{H}$ S S S	$\overset{*}{H}$ S D D D	H H S D D	S L S S S

Classifying Appliance Dealers

	W•N	W•I	W•S	M•F
	P C r I S	P C r I S	P C r I S	P C r I S
AC	H $\overset{*}{H}$ $\overset{*}{D}$ D D	H $\overset{*}{H}$ S D D	$\overset{*}{H}$ S S S S	S S S S S
AR	H $\overset{*}{H}$ D D D	H $\overset{*}{H}$ S D D	H S S S S	S S S S S
RV	H S S S S	H S S $\overset{*}{D}$ $\overset{*}{D}$	H S S S S	S S S S S
RC	H S S $\overset{*}{D}$ $\overset{*}{D}$	H S S S $\overset{*}{D}$	H S S S S	S S S S S

Alphabetizing Appliance Dealers

	W•N					W•I					W•S					M•F				
	P	C	r	I	S	P	C	r	I	S	P	C	r	I	S	P	C	r	I	S
AC	H	S	S	$\overset{*}{D}$	$\overset{*}{D}$	H	$\overset{*}{H}$	S	S	S	$\overset{*}{H}$	$\overset{*}{H}$	S	S	S	S	$\overset{*}{L}$	S	D	$\overset{*}{D}$
AR	H	S	S	D	$\overset{*}{D}$	H	$\overset{*}{H}$	$\overset{*}{D}$	D	D	H	$\overset{*}{H}$	S	S	S	$\overset{*}{L}$	$\overset{*}{L}$	S	D	D
RV	H	$\overset{*}{H}$	$\overset{*}{D}$	$\overset{*}{D}$	S	H	S	$\overset{o}{N}$	S	S	H	S	S	$\overset{*}{D}$	$\overset{*}{D}$	S	$\overset{*}{L}$	S	S	S
RC	H	$\overset{*}{H}$	S	S	S	H	S	S	S	S	H	S	S	S	S	S	$\overset{*}{L}$	S	S	S

[o] Neither group had significant correlation.

Coding Application Data

	W•N					W•I					W•S					M•F				
	P	C	r	I	S	P	C	r	I	S	P	C	r	I	S	P	C	r	I	S
AC	H	S	S	S	S	H	S	S	S	S	$\overset{*}{H}$	S	S	S	S	S	$\overset{*}{L}$	S	S	S
AR	H	S	S	S	S	H	S	S	S	S	H	S	S	S	S	$\overset{*}{H}$	$\overset{*}{L}$	S	S	S
RV	H	H	S	D	$\overset{*}{D}$	H	S	S	S	S	H	S	S	S	S	S	L	S	D	$\overset{*}{D}$
RC	H	H	S	$\overset{*}{D}$	$\overset{*}{D}$	H	S	S	S	S	H	S	S	S	S	S	L	S	$\overset{*}{D}$	S

Copying Application Data

	W•N					W•I					W•S					M•F				
	P	C	r	I	S	P	C	r	I	S	P	C	r	I	S	P	C	r	I	S
AC	H	S	S	S	S	H	S	S	S	S	$\overset{*}{H}$	S	S	S	S	S	$\overset{*}{L}$	S	D	$\overset{*}{D}$
AR	H	S	S	S	S	H	S	S	S	S	H	S	S	S	S	$\overset{*}{H}$	$\overset{*}{L}$	S	$\overset{*}{D}$	S
RV	H	S	S	$\overset{*}{D}$	$\overset{*}{D}$	H	S	S	S	S	H	S	S	S	S	H	L	S	D	D
RC	H	S	S	D	D	H	S	S	S	S	H	S	S	S	S	S	L	S	D	$\overset{*}{D}$

Copying Housing Qualifications

	W•N					W•I					W•S					M•F				
	P	C	r	I	S	P	C	r	I	S	P	C	r	I	S	P	C	r	I	S
AC	H	S	S	S	S	H	S	S	S	S	H	S	S	S	S	S	L	S	D	$\overset{*}{D}$
AR	H	S	S	S	S	H	S	S	S	S	H	S	S	S	S	$\overset{*}{H}$	$\overset{*}{L}$	S	D	$\overset{*}{D}$
RV	H	H	S	S	S	H	$\overset{*}{H}$	S	S	S	H	S	S	S	S	S	L	S	D	D
RC	H	H	S	D	$\overset{*}{D}$	H	$\overset{*}{H}$	S	$\overset{*}{D}$	$\overset{*}{D}$	H	S	S	S	S	S	L	S	D	$\overset{*}{D}$

Classifying Housing Qualifications

	W•N	W•I	W•S	M•F
	P C r I S	P C r I S	P C r I S	P C r I S
AC	H S S S S	H H S S S	$\overset{*}{H}$ S S S S	S S S S S
AR	H S S $\overset{*}{D}$ S	H H S S S	H S S S S	$\overset{*}{H}$ S S $\overset{*}{D}$ S
RV	H H S S S	H H S D D	H S S S S	S L S $\overset{*}{D}$ $\overset{*}{D}$
RC	H H S S S	H H S D $\overset{*}{D}$	H S S S S	S L S D $\overset{*}{D}$

Classifying Zip Codes

	W•N	W•I	W•S	M•F
	P C r I S	C r I S	P C r I S	P C r I S
AC	H H D D D	H $\overset{*}{H}$ S D D	$\overset{*}{H}$ $\overset{*}{H}$ S D $\overset{*}{D}$	$\overset{*}{L}$ L S D D
AR	H H D D D	H H $\overset{*}{D}$ D D	H $\overset{*}{H}$ S S S	S L D D D
RV	H S S $\overset{*}{D}$ D	H S S D D	H S S S S	S $\overset{*}{L}$ S S S
RC	H S S D $\overset{*}{D}$	H S S D $\overset{*}{D}$	H S S S S	S $\overset{*}{L}$ S $\overset{*}{D}$ $\overset{*}{D}$

Locating Personnel Information

	W•N	W•I	W•S	M•F
	P C r I S	P C r I S	P C r I S	P C r I S
AC	H H S S S	H H S S S	H H S S S	S S S S S
AR	H H S S S	H H S S S	S $\overset{*}{H}$ S S S	H S S S S
RV	H H S $\overset{*}{D}$ $\overset{*}{D}$	H S S S S	H $\overset{*}{H}$ S S S	S S S S S
RC	H H S S S	H S S S S	H $\overset{*}{H}$ S S S	S S S S S

Calculating Postage Charges

	W•N	W•I	W•S	M•F
	P C r I S	P C r I S	P C r I S	P C r I S
AC	H H S D D	H $\overset{*}{H}$ S S S	$\overset{*}{H}$ S S S S	L S S S S
AR	H H S D D	H H S S S	H S S S S	S S S S S
RV	H H S S S	H S S S S	H S S S S	S $\overset{*}{L}$ S S S
RC	H H S D $\overset{*}{D}$	H S S S S	H S S S S	S $\overset{*}{L}$ D D D

SIGNIFICANCE OF DIFFERENCES* BETWEEN SLOPES

(Before Removal of Deviate Cases)

CPM	Arithmetic Computation				Arithmetic Reasoning				Reading Vocabulary				Reading Comprehension				Total CPM Differences		
	W·N	W·I	W·S	M·F	W·N	W·I	W·S	M·F	W·N	W·I	W·S	M·F	W·N	W·I	W·S	M·F	S	$\overset{*}{D}$	D
Checking Applications												$\overset{*}{D}$	$\overset{*}{D}$				14	2	0
Comparing Addresses		$\overset{*}{D}$				D				D				D		$\overset{*}{D}$	11	2	3
Comparing Telephone Information		$\overset{*}{D}$	$\overset{*}{D}$			D				D				D	D		10	2	4
Copying Telephone Information		$\overset{*}{D}$				D				D					D		11	1	4
Classifying Appliance Dealers	D	D			D	D				$\overset{*}{D}$			$\overset{*}{D}$	$\overset{*}{D}$			9	3	4
Alphabetizing Appliance Dealers	$\overset{*}{D}$			$\overset{*}{D}$	$\overset{*}{D}$			D			$\overset{*}{D}$						11	4	1
Coding Application Data									$\overset{*}{D}$			$\overset{*}{D}$	$\overset{*}{D}$				13	3	0
Copying Application Data				$\overset{*}{D}$					$\overset{*}{D}$			D	$\overset{*}{D}$			$\overset{*}{D}$	11	3	2
Copying Housing Qualifications				$\overset{*}{D}$				$\overset{*}{D}$				D				$\overset{*}{D}$	12	3	1
Classifying Housing Qualifications										D		$\overset{*}{D}$	$\overset{*}{D}$	$\overset{*}{D}$		$\overset{*}{D}$	11	4	1
Locating and Classifying Zip Codes	D	D	$\overset{*}{D}$	D	D	D		D	D	D			$\overset{*}{D}$	$\overset{*}{D}$		$\overset{*}{D}$	4	4	8
Locating Personnel Information									$\overset{*}{D}$								15	1	0
Calculating Postage Charges	D				D								$\overset{*}{D}$			D	12	1	3
D or $\overset{*}{D}$	4	5	2	4	4	5	0	3	4	6	1	5	7	6	2	6	144	33	31

Summary Tables

D or $\overset{*}{D}$		D or $\overset{*}{D}$
W·N = 19		AC = 15
W·I = 22		AR = 12
W·S = 5		RV = 16
M·F = 18		RC = 21
64		64

*When no letter is inserted, the difference is not statistically significant; $\overset{*}{D}$ means significant difference at the 5% level; D means significant difference at the 1% level.

W·N - White vs Negro; W·I - White vs Indian; W·S - White vs Spanish; M·F - Male vs Female.

SIGNIFICANCE OF DIFFERENCES* BETWEEN INTERCEPTS

(Before Removal of Deviate Cases)

CPM	Arithmetic Computation				Arithmetic Reasoning				Reading Vocabulary				Reading Comprehension				Total CPM Differences		
	W·N	W·I	W·S	M·F	W·N	W·I	W·S	M·F	W·N	W·I	W·S	M·F	W·N	W·I	W·S	M·F	S	$\overset{*}{D}$	D
Checking Applications												$\overset{*}{D}$	D			$\overset{*}{D}$	13	3	1
Comparing Addresses		$\overset{*}{D}$				D				D				D		$\overset{*}{D}$	11	2	3
Comparing Telephone Information		$\overset{*}{D}$	$\overset{*}{D}$			D		D		D				D	D		9	2	5
Copying Telephone Information		D		$\overset{*}{D}$		D		$\overset{*}{D}$		D				D	D		9	2	5
Classifying Appliance Dealers	D	D			D	D							$\overset{*}{D}$				11	1	4
Alphabetizing Appliance Dealers	$\overset{*}{D}$			D	D	D		D	$\overset{*}{D}$		$\overset{*}{D}$						9	3	4
Coding Application Data												$\overset{*}{D}$	$\overset{*}{D}$			$\overset{*}{D}$	13	3	0
Copying Application Data				$\overset{*}{D}$				$\overset{*}{D}$	$\overset{*}{D}$			D	D			D	10	3	3
Copying Housing Qualifications				D				D				D		$\overset{*}{D}$		D	11	1	4
Classifying Housing Qualifications					D			$\overset{*}{D}$		D			$\overset{*}{D}$	D		D	11	2	4
Locating and Classifying Zip Codes	D	D	D	D	D	D		D		D			D	D		$\overset{*}{D}$	5	1	10
Locating Personnel Information									$\overset{*}{D}$								15	1	0
Calculating Postage Charges	D				D											D	13	0	3
D or $\overset{*}{D}$	4	5	2	5	5	6	0	7	3	5	1	4	6	6	2	8	139	23	46

Summary Tables

D or $\overset{*}{D}$

W·N = 18
W·I = 22
W·S = 5
M·F = 24
69

D or $\overset{*}{D}$

AC = 16
AR = 18
RV = 13
RC = 22
69

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*When no letter is inserted, the difference is not statistically significant; $\overset{*}{D}$ means significant difference at the 5% level; D means significant difference at the 1% level.

W·N - White vs Negro; W·I - White vs Indian; W·S - White vs Spanish; M·F - Male vs Female.

SIGNIFICANCE OF DIFFERENCES* BETWEEN SLOPES

(After Removal of Deviate Cases)

CPM	Arithmetic Computation			Arithmetic Reasoning			Reading Vocabulary			Reading Comprehension			Total CPM Differences		
	W·N	W·I	M·F	W·N	W·I	M·F	W·N	W·I	M·F	W·N	W·I	M·F	S	$\overset{*}{D}$	D
Checking Applications													12	0	0
Comparing Addresses													12	0	0
Comparing Telephone Information													12	0	0
Copying Telephone Information													12	0	0
Classifying Appliance Dealers	D			$\overset{*}{D}$				D					9	1	2
Alphabetizing Appliance Dealers													12	0	0
Coding Application Data										$\overset{*}{D}$			11	1	0
Copying Application Data										D			11	0	1
Copying Housing Qualifications										D			11	0	1
Classifying Housing Qualifications													12	0	0
Locating and Classifying Zip Codes	D		D	D		D						$\overset{*}{D}$	7	1	4
Locating Personnel Information							$\overset{*}{D}$						11	1	0
Calculating Postage Charges	D	—	—	D	—	—	—	—	—	$\overset{*}{D}$	—	D	8	1	3
D or $\overset{*}{D}$	3	0	1	3	0	1	1	1	0	4	0	2	140	5	11

Summary Tables

D or $\overset{*}{D}$	
W·N =	11
W·I =	1
M·F =	4
	16

D or $\overset{*}{D}$	
AC =	4
AR =	4
RV =	2
RC =	6
	16

*When no letter is inserted, the difference is not statistically significant; $\overset{*}{D}$ means significant difference at the 5% level; D means significant difference at the 1% level.

W·N - White vs Negro; W·I - White vs Indian; M·F - Male vs Female.

The number of significant White·Spanish differences were so few that deviate cases were not removed and data recalculated.

SIGNIFICANCE OF DIFFERENCES* BETWEEN INTERCEPTS

(After Removal of Deviate Cases)

CPM	Arithmetic Computation			Arithmetic Reasoning			Reading Vocabulary			Reading Comprehension			Total CPM Differences		
	W·N	W·I	M·F	W·N	W·I	M·F	W·N	W·I	M·F	W·N	W·I	M·F	S	$\overset{*}{D}$	D
Checking Applications													12	0	0
Comparing Addresses													12	0	0
Comparing Telephone Information													12	0	0
Copying Telephone Information			$\overset{*}{D}$			$\overset{*}{D}$							10	2	0
Classifying Appliance Dealers	D			D				D					9	0	3
Alphabetizing Appliance Dealers					D								11	0	1
Coding Application Data										$\overset{*}{D}$			11	1	0
Copying Application Data									$\overset{*}{D}$	D		$\overset{*}{D}$	9	2	1
Copying Housing Qualifications			$\overset{*}{D}$			D				D			9	1	2
Classifying Housing Qualifications													12	0	0
Locating and Classifying Zip Codes	D		D	D		D						D	7	0	5
Locating Personnel Information							$\overset{*}{D}$						11	1	0
Calculating Postage Charges	D	—	—	D	—	—	—	—	—	D	—	D	8	0	4
D or $\overset{*}{D}$	3	0	3	3	1	3	1	1	1	4	0	3	133	7	16

Summary Tables

D or $\overset{*}{D}$	
W·N	11
W·I	2
M·F	10
	23

D or $\overset{*}{D}$	
AC	6
AR	7
RV	3
RC	7
	23

*When no letter is inserted, the difference is not statistically significant; $\overset{*}{D}$ means significant difference at the 5% level; D means significant difference at the 1% level.

W·N - White vs Negro; W·I - White vs Indian; M·F - Male vs Female.

The number of significant White·Spanish differences were so few that deviate cases were not removed and data recalculated.

IDENTIFYING TASK CLUSTERS

Job to be described: ________________________________ Date __________

Described by: ______________________, ______________________________
name Employee, Supervisor, Trainer, Job Analyst, or other.

This form is to be used only for those jobs where ideas, information, or data are used. Within any such job there are usually from one to five major functions. The form below provides a means of describing the tasks that go together to see that each function is performed.

First, describe in from one to five sentences each of the major job functions. Avoid describing minor duties or occasional duties. Include statements only if the function is an important or very significant part of the job. Number each major function. The description of the first function has been started.

Function:

1. To

Describing Each Function

Under each heading you will further describe the tasks that are performed to serve that function.

A. Sources of Information Used in the Task

Describe the sources of the information used in the task. Read the following numbered list of possibilities and for each function write in the proper column the number(s) of the sources used. ⟶

Major Functions				
1	2	3	4	5

1. Obtains information from published sources which are well-suited to job task (e.g. directory, catalog, map, dictionary, rate schedule, time table).

2. Obtains information from resources (e.g. files, manuals, guides, etc.).

3. Searches for information from sources where data are not readily available.

4. Seeks information from persons by phone or in person who have information readily available.

5. Obtains information from persons, using specialized skills to elicit attitudes, underlying needs, personal relationships, etc.

6. Must rely on personal memory of written sources.

7. Observes current events, objects, conditions, people.

8. Information comes to employee in a form ready for work (e.g. from files, forms, people, etc.).

9. Other (describe on back of form).

B. Action Taken

Describe what is done to or with the information sought or received in Task A. Read the following list of possibilities and for each function record in the proper column the Roman numeral(s) for the action taken. →

Major Functions

1	2	3	4	5

I Comparing two sets of data to see if the components are the same or different.

II Examining a set of data to identify any missing information.

III Sorting (filing, compiling, posting, etc.).

IV Classifying (evaluate, assign, catalog, select, etc.)

V Computing (including counting of cases falling into special categories).

VI Abstracting (summarizing, condensing, etc.).

VII Deducing/inferring.

VIII Creating/innovating (authoring).

IX No manipulation performed. (Persons copies data from one place to another without any modification of it.)

X Other (describe on back of form).

C. What is Considered

In deciding what action to take, the employee must consider various relevant information, conditions, rules, standards, etc. (e.g. age, sex, money, size, color, etc., etc.). List the factors that are considered in this function, and record the total number of considerations for each function. →

Major Functions

1	2	3	4	5

D. Clarity of Rules

In making these decisions, how specific are the rules, guides, or standards that are followed? Indicate the degree of specificity by writing in the number of one of the following choices: →

Major Functions				
1	2	3	4	5

1. Very specific guides, clear-cut procedure with definite categories, little leeway for judgment.
2. Specificity lying somewhere between 1 and 2.
3. Very general guidelines, no fixed fules, categories vague, uses general verbal concepts (e.g. deals with degree of need, urgency, moral risk, etc.).

E. Task Output

What is the form of output in this function? How are the results of the work expressed? Read the following possibilities and record the proper letter(s) for each function. →

Major Functions				
1	2	3	4	5

A. The data are placed in a standard written form or physical objects may be handled with standard operating procedures, e.g. filing, counting cash.

B. The output is in written form but following only general guidelines (not specified as in A).

C. The output is given to one or more persons in a standard form (simple information given in reply to a question).

D. The information is given to persons following only general guidelines (explaining, making a speech).

E. The information is given to persons but without any guidelines (found only once).

F. The information is in written form but without guidelines (as in writing stories).

G. The information is directly used by the worker in another task (e.g. worker studies a map to find shortest route and then drives by that route.

H. Other (describe on back of form).

NUMBER OF PERSONS WITH PAID EXPERIENCE ON MPM TASKS

	No Experience	Experience Something Like MPM	Experience Exactly Like MPM	No Reply
Checking Applications	495	11	70	7
Comparing Addresses	474	25	85	7
Comparing Telephone Information	486	13	43	16
Copying Telephone Information	493	13	39	14
Classifying Appliance Dealers Alphabetizing Appliance Dealers	488	23	108	11
Coding Application Copying Application Data	500	8	54	21
Copying Housing Qualifications Classifying Housing Qualifications	542	4	26	11
Locating and Classifying Zip Codes	535	10	31	19
Locating Personnel Information	435	19	50	19
Calculating Postage Charges	456	11	46	8
Total	4,904	137	502	133
Percent	86%	2%	9%	2%

STATISTICAL FORMULAE

The following formulae were used in various phases of the statistical analyses*:

$$\Sigma X = Mn \cdot N$$

$$\Sigma X^2 = \sigma^2 N + Mn^2 N$$

$$\sigma_{Mn} = \frac{\sigma}{\sqrt{N}}$$

$$\Sigma XY = N\, Mn_1\, Mn_2 + N r_{12}\, \sigma_1\, \sigma_2$$

$$r = \frac{\frac{\Sigma XY}{N} - Mn_1\, Mn_2}{\sigma_1\, \sigma_2}$$

$$\sigma_r = \frac{1 - r^2}{\sqrt{N-1}}$$

$$\sigma = \sqrt{\frac{\Sigma X^2 - Mn^2 N}{N}}$$

$$\sigma_{est.} = \sigma_1 \sqrt{1 - r^2}$$

$$b = r \cdot \frac{\sigma_1}{\sigma_2}$$

$$\sigma_b = \frac{\sigma_1}{\sigma_2} \sqrt{\frac{1 \cdot r^2}{N}}$$

$$a = Mn_1 - b \cdot Mn_2$$

$$\sigma_a = \sigma_{est.} \sqrt{\frac{\Sigma X_2^2}{N^2 \cdot \sigma_2^2}}$$

BIBLIOGRAPHY

American Psychological Association. Standards for educational and psychological tests and manuals. Washington: 1966, 1974.

American Psychological Association Task Force on Employment Testing of Minority Groups. Job testing and the disadvantaged. American Psychologist, 1969, 24, 637-650.

Bereiter, C., & Engelmann, S. Teaching disadvantaged children in the preschool. New Jersey: Prentice-Hall, Inc. 1966.

Bruner, J.S., Goodnow, J.J., & Austin, G.A. A study of thinking. New York: John Wiley & Sons, 1956.

Carnap, R. The logical syntax of language. London: Broadway House, 1937.

Church, J. Language and the discovery of reality. New York: Random House, 1961.

Cleary, T.A., & Hilton, T.I. Test bias: prediction of grades of Negro and White students in integrated colleges. Journal of Educational Measurement, 1968, 5, 115-124.

Deese, J., & Hulse, S.H. The psychology of learning. New York: McGraw-Hill, 1958.

Equal Employment Opportunity Coordinating Council. Uniform guidelines on employment selection procedures - discussion draft, August 23, 1973.

Fine, S.A., Holt, A.M., & Hutchinson, M.F. Functional job analysis: an annotated bibliography. Washington: W.E. Upjohn Institute, 1975.

Fox, H., & Lefkowitz, J. Differential validity: ethnic group as a moderator in predicting job performance. Personnel Psychology, 1974, 27, 209-223.

Galler, B.A. The language of computers. New York: McGraw-Hill, 1962.

Ginsburg, H., & Opper, S. Piaget's theory of intellectual development: an introduction. New Jersey: Prentice-Hall, Inc., 1969.

Glaser, R., et al. Current trends in the description and analysis of behavior. Pittsburgh: University of Pittsburgh Press, 1958.

Hahn, C.P. Collection of performance data at the job task level. Paper presented at the 1973 Military Testing Association Convention, San Antonio, Texas, November 1973.

Hawkridge, D.G., Campeau, P.L., DeWitt, K.M., & Trickett, P.K. A study of further selected exemplary programs for the education of disadvantaged children. Palo Alto: American Institutes for Research, 1969.

Hoepfner, R., et al. (Ed.) *CSE-RBS test evaluations: tests of higher-order cognitive, affective, and interpersonal skills*. Los Angeles: Center for the Study of Evaluation, Graduate School of Education, University of California, 1972.

Humphreys, L.G. Statistical definitions of test validity for minority groups. *Journal of Applied Psychology*, 1973, *58*, 1-4.

Hunt, E.B. *Concept learning: an information processing problem*. New York: John Wiley & Sons, 1966.

Labor Department. *Handbook for analyzing jobs*. U.S. Department of Labor, Manpower Administration Report, 1972.

Linn, R.L. Fair test use in selection. *Review of Educational Research*, 1973, *43*, 139-161.

Loretan, J.O., & Umans, S. *Teaching the disadvantaged*. New York: Teachers College Press, 1966.

McCormick. E.J., Jeanneret, P.R., & Mecham, R.C. A study of job characteristics and job dimensions as based on the Position Analysis Questionnaire (PAQ). *Journal of Applied Psychology*, 1972, *56* (4).

Meadow, C.T. *The analysis of information systems: a programmer's introduction to information retrieval*. New York: John Wiley & Sons, 1967.

Peterson, R.O., & Jones, E.M. *Development of a system of job activity elements for the mentally retarded*. Pittsburgh: American Institutes for Research, 1959.

Schmidt, F.L., Berner, J.G., & Hunter, J.E. Racial differences in validity of employment tests: reality or illusion? *Journal of Applied Psychology*, 1973, 58, 5-9.

Scribner, S., & Cole, M. Cognitive consequences of formal and informal education. *Science*, 1973, *182*, 553-559.

Simon, H.A. *Administrative behavior. A study of decision-making processes in administrative organization*. New York: Macmillan, 1961.

Simon, H.A., & Siklossy, L. (Eds.) *Representation and meaning. Experiments with information processing systems*. New Jersey: Prentice-Hall, 1972.

Wall Street Journal. Job tests are dropped by many companies due to anti-bias drive. *Wall Street Journal*, Volume CLXXXVI, No. 45, September 3, 1975.

Whimbey, A. Something better than Binet? *Saturday Review*, 1974, 50-53.

Directions for Administering and Worksheets for each CPM, plus Special Scoring Directions and Background Data Sheet are contained in the following pages.

Directions for Administration

Checking Applications

Distribute to each person a Recording Sheet and one set of gold Application forms (15 forms to a set). When completed, say, "Each of you has a set of 15 Application forms, and a Recording Sheet. Write your name and identification number on the Recording Sheet." (Pause) When all persons have completed the heading information, say, "Now read the Instructions while I read them aloud."

Instructions

"You work for an agency that provides various services to the public. To apply for these services an individual must first complete an APPLICATION FOR SERVICES form. For this task you are to assume that part of your job is to review each application to see if all the information has been given.

To do this task you will need a set of "completed" APPLICATION FOR SERVICES forms, this RECORDING SHEET and a pencil. Write only on the RECORDING SHEET. DO NOT WRITE on or make any marks on the Application forms.

You do this task by reading an Application, looking down through the form to see if any required information has been omitted. When you find an item that has been left blank, circle the number of that item on the Recording Sheet in the space provided after the applicant's name, but do not write or make any marks on the Application form itself. Review the entire Application form for each person and circle the number of each item that has been left blank." (End of Instructions)

"Now look at the first Application." (Pause) "The person's name on this application is Lawrence E. Brown. There are 15 kinds of information to be supplied by the applicant. Some of the items require a written answer, others just require a check or "X" mark in the appropriate box.

"Reviewing Mr. Brown's application, we see that items 1 and 2, name and address, have been filled out. (Pause) Item 3, the Social Security Number has been left blank. On the Recording Sheet notice that the number "3" has been circled on the line after Mr. Brown's name since item number 3 was not filled out on his application form. (Pause)

"Looking back at the application form, items (slowly) 4, 5, 6, 7 and 8 have all been answered. (Pause) Notice that for items 6, 7 and 8, one, and only one, box must be checked for each item, with the other box left blank. (Pause)

Item 9, however, has not been answered. To answer that item either the Employed box or the Not Employed box must be checked. Since neither box was checked, the number 9 has been circled on the Recording Sheet to show that Mr. Brown also left item 9 blank." (Pause)

"Looking again at the Application form we see that answers have been written in or boxes checked for each of the remaining items on the form, through the last item, number 15. On the Recording Sheet the circles around the 3 and the 9 on the line after Mr. Brown's name show that only items three and nine were not completed on his application form."

"Now you are to go on to the other application forms and go through them in the same way, looking for items that have not been completed. The Number of each item that has been left blank is to be circled on the Recording Sheet on the line for that application."

"Are there any questions about what to do? (Pause to answer questions.)

"Please do not write on or make any marks on the Applications. Begin now. Raise your hand if you have any questions and raise your hand when you have finished."

Record the starting time.

As examinees complete their work, be sure to remind them to complete the experience questions. If any persons are not finished in 14 minutes working time, ask them to stop and you mark their papers, "DID NOT FINISH". Be sure, however, to obtain their answers to the experience questions at the bottom. Collect all sets of Applications and Recording Sheets.

Supplies needed:

1 set of Applications (15, gold)

1 Recording Sheet

Name ______________________________

Identification Number __________

RECORDING SHEET

CHECKING APPLICATIONS

Instructions

You work for an agency that provides various services to the public. To apply for these services an individual must first complete an APPLICATION FOR SERVICES form. For this task you are to assume that part of your job is to review each application to see if all the information has been given.

To do this task you will need a set of fifteen "completed" APPLICATION FOR SERVICES forms, this Recording Sheet, and a pencil. Write only on the Recording Sheet. Do not write on or make any marks on the Application forms.

You do this task by reading an Application, looking down through the form to see if any required information has been omitted. When you find an item that has been left blank, circle the number of that item on the Recording Sheet in the space provided after the applicant's name, but do not write or make any marks on the Application form itself. Review the entire Application form and circle the number of each item that has been left blank.

	APPLICANT'S NAME	APPLICATION ITEM NUMBERS														
1.	BROWN	1	2	[✓ 3]	4	5	6	7	8	[✓ 9]	10	11	12	13	14	15
2.	BURKE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
3.	COLSON	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
4.	EDWARDS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5.	FELTON	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
6.	GRAHAM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
7.	HARRIS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
8.	MIKANO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
9.	MORENO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
10.	PETERSON	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

CONTINUE ON OTHER SIDE

APPLICANT'S NAME		APPLICATION ITEM NUMBERS														
11.	SANCHEZ	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
12.	SCATZ	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
13.	SPINOLLA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
14.	TRACO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
15.	WILSON	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Have you ever had a job on which you were paid for doing a task anything like this task?

☐ Yes ☐ No

for doing a task very much like this one?

☐ Yes ☐ No

10/17/74

Name ______________________

Identification Number ________

WORKSHEET

COMPARING ADDRESSES

		Same	Different
1.	James Martin	[✓ S]	D
	114 East Royal Street	[✓ S]	D
	Hadley, Ohio 44429	S	[✓ D]
2.	Ralph Gomez	S	D
	2913 Hasbrook Road	S	D
	Lesbon, Mast., 01528	S	D
3.	R & P Hastings Co.	S	D
	E. Parks Drive	S	D
	Tacoma, Washington 98403	S	D
4.	Miss Jane Stewart	S	D
	Atlanta St.	S	D
	McAfee, N.J. 07438	S	D
	STOP		
5.	A. L. Richards	S	D
	14 Buena Vista Dr.	S	D
	Millbrae, Calif. 94030	S	D
6.	Hayes Real Estate	S	D
	2137 Premrose Drive	S	D
	Easton, Louisana 70530	S	D
7.	James W. Pinkus	S	D
	4431 Mulberry Court	S	D
	Windsor, Coloardo 86550	S	D
8.	Celia C. Kiefer	S	D
	2900 Arlington Ave.	S	D
	Auburn, New Hampshire 03032	S	D
9.	J. A. Wagner	S	D
	2 Rosemary Way	S	D
	Stoney Creek, Virginia 23802	S	D

		Same	Different
10.	Myers Furnace Supply Co.	S	D
	614 Cliff Avenue	S	D
	Nelson George 30151	S	D
11.	Charles Eisel	S	D
	306 Clever Drive	S	D
	Deep Run, North Carolina 28525	S	D
12.	L. M. Owens	S	D
	5180 Holmes Street	S	D
	Liberty, Kansas 76351	S	D
13.	Berger Drug Store	S	D
	6752 Reynold Avenue	S	D
	May City, Iowa 41359	S	D
14.	Harry J. Anderson	S	D
	141 Cheery Way	S	D
	Clinton, New York 13323	S	D
15.	N. L. Perry	S	D
	44 Academy Avenue	S	D
	Spring, Texas 73773	S	D
16.	W. R. Gruley	S	D
	2020 Webster Avenue	S	D
	Eden Mills, Vermont 06563	S	D
17.	Mary F. Chavis	S	D
	20 Ceder Boulevard	S	D
	Richmond, Utah 84433	S	D
18.	Forsythe Equipment Company	S	D
	3 East Orchard Lane	S	D
	Westland, Mississippi 39209	S	D

CONTINUE ON OTHER SIDE

		Same	Different
19.	Ken Dorset Painting	S	D
	1020 Clara Drive	S	D
	Palo Alto, Calif., 94302	S	D
20.	Lewis L. Roth	S	D
	457 Broadway	S	D
	Toledo, Ohio 43601	S	D
21.	T. R. Thompson	S	D
	1713 Bedford Avenue	S	D
	Philadelphia, Pennsylvania 11904	S	D
22.	Valley Freight Lines	S	D
	1809 West Carson Street	S	D
	Providence, Rhode Island 02904	S	D
23.	William Smith	S	D
	3266 Main Street	S	D
	Dallas, Texas 77521	S	D
24.	Gail E. Bates	S	D
	197 W. Bellevue Avenue	S	D
	Billings, Montana 59107	S	D

		Same	Different
25.	Ernest Groves	S	D
	1216 Boyle Road	S	D
	Pheonix, Arizona 85026	S	D
26.	Dr. Artur Riley	S	D
	P. O. Box 507	S	D
	Zephyhills, Florida 33599	S	D
27.	Miss Heather Lea	S	D
	203 Summit Avenue	S	D
	Salem, New Hampshire 03079	S	D
28.	Brown's Dairy	S	D
	16 Race Avenue	S	D
	Elmwood, Oklahoma 73539	S	D
29.	John G. Young	S	D
	714 Elysain Street	S	D
	Oak Park, Illinois 60301	S	D
30.	Elizabeth Keenan	S	D
	2603 McGee Place	S	D
	Madisen, Wisconsin 53703	S	D

Have you ever had a job on which you were paid for doing a task anything like this task?

☐ Yes ☐ No

for doing a task very much like this one?

☐ Yes ☐ No

APPLICATION FOR SERVICES

All applicants for the services provided by this department are required to complete this application form. Please complete all items. Do not leave any questions unanswered.

1. Name BROWN LAWRENCE E
Last First Middle Initial

2. Address 1439 CRESCENT St. BILOXI, MISS. 88432
Street Number Town State Zip Code

3. Social Security Number ____________

4. Sex ☒ Male ☐ Female (Check only one box)

5. Date of Birth JULY / 12 / 1942
Month Day Year

Education: (Check whether you COMPLETED OR DID NOT COMPLETE each level of school in questions 6, 7, and 8)

		Completed		Did not Complete	
6.	Grade School	☒	or	☐	(Check only one box)
7.	High School	☒	or	☐	(Check only one box)
8.	College or University	☐	or	☒	(Check only one box)

9. Currently I am: ☐ Employed ☐ Not Employed (Check only one box)

My last two jobs were: (List current or most recently held job first)

10. GULF PAPER CORP.
Name of Company

11. CARTON PACKER
Job Description or Title

12. SOUTHERN MEAT PACKING
Name of Company

13. BUTCHER'S HELPER
Job Description or Title

Citizenship:

14. I ☒ Am ☐ Am Not a citizen of the U.S.A. (Check only one box)

15. At this time I am ☐ Single ☒ Married ☐ Divorced ☐ Widowed (Check only one box)

Directions for Administration

Comparing Addresses

Distribute to each person a 3 x 5 card file box containing a set of cards showing names and addresses for the task, "Comparing Addresses." There are 4 cards for practice exercises and 26 cards for measuring task performance.

When completed, say, "Each of you has a file box of cards containing the names and addresses of persons and companies to whom correspondence is being sent. Open the file box and look at some of these cards but do not get the cards out of order. Each card shows the name on the first line. (Pause) On the second line is the street address, giving the number and then the name of the street. The third line shows the city address, giving the name of the city, the name of the state and the mailing zip code."

Now distribute the work sheet, headed "Comparing Addresses," saying, "Here is a work sheet. Write your name in the space at the top of the page." (Pause) The work sheet has the same addresses as in the file box as copied by another person. Your task is to check whether or not each line of the address has been copied correctly. If the line of the address is exactly the same on the card in the box and on your work sheet, you will put a cross through the "S". If the lines are different, you will put a cross through the "D"."

"Now look at the first card in your file box. (Pause) It says, 'James Martin, 114 East Royal Street, Hadley, Ohio 44420.' Now look at the copy of this address on your work sheet in the upper left hand corner. The first line is exactly the same as in the card file. Therefore, a cross has been put through the letter 'S' to indicate that the copy is exactly the same."

"Now look at the street address. The copy says '114 East Royal Street'. It is exactly the same as in the card file; so again a mark has been put through the letter S. For the city address, the copy shows Hadley, Ohio, 44429. Here the copy is not the same because the last number is different, 9 instead of zero. Therefore a mark has been put through D to show that the copy is different."

"Do you have any questions about what to do?" (Answer any questions, stressing that the copy must be exactly the same before the S is marked.)

"Now look at the second card in the card file. (Pause) It says, 'Doctor Ralph Gomez, 2913 Hasbrook Road, Lisbon, Mass., 01528.' Now look at the second address in the Worksheet. (Pause) The name is Ralph Gomez but the title Doctor has been omitted. So put a cross through the letter D, for different, to the right of the name, Gomez."

"Now look at the next line. Is the street address the same or different in the copy? (Pause) It is the same, so put a cross through the letter 'S' after Hasbrook Road."

"Now look at the city address. Is it the same as in the card file? (Pause) No. Lisbon has been spelled with an 'e' instead of an 'i'. And the state has been spelled incorrectly. Therefore, put a cross through the letter 'D' after the city address."

"Do you have any questions about this comparing? (Pause for any questions and answers.) Now complete the next two · cards by putting a cross through S or D for each line. Stop after 2 cards. Do not go on to number 5."

Allow about three minutes for these cards, then say, "Here are the answers for these first cards. For card number 3 (pause), R and P Hastings is different - D because the 'and' is not the same. Their address is different - D' because East is not fully spelled out in the copy. The copy address is 'S', the same."

"In card number 4, the person's name, Miss Jane Stewart is the same so you should have 'S' after her name. Her address is not the same. The word Street is not spelled out fully. So a cross goes through 'D' after Street. Similarly her state, New Jersey, has been abbreviated in the copy and hence the mark should be different - 'D'."

"Do you have any questions about this task?" (Answer any questions.) (Pause) Now begin with card number 5 and continue checking until all the cards are completed. Do not put any marks on the cards nor get them out of order. Begin now, and let me have your Worksheet and file box when you have completed the task."

Record the starting time.

If any persons are not finished in 18 minutes, ask them to stop. Be sure to have them answer the experience questions and mark their papers, "DID NOT FINISH".

Supplies needed

For each examinee:

1 File Box containing the set of cards for the task,

"Comparing Addresses" (Box also used in Filing Appliance Dealers' Cards)

1 Comparing Addresses Worksheet

Front Side - Identification, 4 examples and items 5 - 18

Back Side - Items 19 - 30

Name ______________________________

Identification Number ____________

Worksheet
COMPARING TELEPHONE INFORMATION

Name	Address and Telephone Numbers	Same	Different
Brant David W	182 Hinkel Rd	[✓ S]	D
	931-4992	S	[✓ D]
Briggs John	600 Cliffside Manor	S	D
	761-5760	S	D
Cichoski Wm P	3831 Bonaventur Wy	S	D
	761-0326	S	D
Clarke Phillip M	Hampton Farms Dr	S	D
	486-2627	S	D
Clem Donald Y	6 The Knob	S	D
	761-5181	S	D
Mazzoni A J	213 Maryland Dr Glnsh	S	D
	486-4635	S	D
McClain Edw J Jr	55 N Ralph Av	S	D
	761-1678	S	D
McClone John W	330 Escher Rd	S	D
	766-0298	S	D
Unks Sadie L	2645 Brightn Rd	S	D
	776-1759	S	D
Ussack Edw	113 1 Av Laurl Grdns	S	D
	366-2805	S	D
Valetti Gina	34 Beylreye Av	S	D
	728-2406	S	D
Smith Thos A	434 Roosevelt Av	S	D
	761-4091	S	D
Smith L	909 California Av	S	D
	766-8301	S	D

CONTINUE ON OTHER SIDE

Name	Address and Telephone Numbers	Same	Different
Smith Richd	325 Ridgewood Av	S	D
	913-1357	S	D
Mapstone Dale	222 Lexington Av	S	D
	781-5032	S	D
Maloney F D	4434 Coleridge	S	D
	781-4840	S	D
Manor Barber Shop	1122 Freeport Rd	S	D
	781-9838	S	D
Arthur M R	7438 Perysvle Av	S	D
	761-5466	S	D
Backes Gerard	118 Forliview Rd	S	D
	486-3456	S	D
Bahorich Jos L	1315 Hawthrne	S	D
	781-8886	S	D
Fliegel John C	1000 Greenhill Rd	S	D
	321-0632	S	D
Foley Wm R	8886 Perry Hwy	S	D
	364-6284	S	D
Fox Chas C	302 Penn Av	S	D
	486-6296	S	D
Potvin Mary	368 Perry Hyw	S	D
	931-6505	S	D
Printz M R	925 Califrna Av	S	D
	767-3812	S	D
Prologo Rocco C	Ruseltn Rd Chswk	S	D
	767-4537	S	D
Reed Thos R	210 Clairmont Av	S	D
	931-2809	S	D

Have you ever had a job on which you were paid
for doing a task anything like this task?

☐ Yes ☐ No

for doing a task very much like this one?

☐ Yes ☐ No

Directions for Administration

Comparing Telephone Information

Distribute a Pittsburgh North Suburban Telephone Directory and a copy of "Comparing Telephone Information" to each examinee. Then say, "At the top of this sheet, write in your name and identification number. (Pause)

"In this task, the job is to see if a list of addresses and telephone numbers are correct by comparing them with those shown in the Telephone Directory you have been given. Please do not make any marks of any kind in this Directory. Remember, no marks should be made in the Directory."

"Notice that this list gives the name, address and telephone number for many people. Your task is to find each name in the Telephone Directory and to compare the address and telephone number appearing in the Directory with those on the list. If the sets of information are exactly alike, place an 'X' through the S, for same on your list. If they are not exactly alike, place an 'X' through the D, for 'different'. Do not write anything or make any marks in the Telephone Directory.

"To make sure you understand how to do this task we will work through two sample cases. Look at the first sample. The person's name is Brant David W. The last name is always presented first. Now open the Telephone Directory to the 'B' listings and find the name, Brant David W." (Pause - if anyone appears to be unable to locate the name say) "Brant David W is on page 20, in the third column, in the lower part of the page." (When everyone has found the name say) "The address for Brant David W is 182 Hinkel Rd. This is exactly the same as the address on your sheet, so an X has been placed through the S. (Pause) The phone number in the Directory is 931-4922 which is different from that on the sheet, so the D has an X through it. Are there any questions?" (Pause)

"Now, look up the address and number for Briggs John and mark your answers for this example. His information is on the next page." (Pause, allow about one minute.)

"The address is different - D. Perhaps the Directory words are the abbreviations for Cliffside Manor, but do not guess about any missing letters. The information on your sheet must be exactly like the Directory before you mark S for same.

The telephone number for Briggs is exactly the same, so you should put an X through the S opposite the number. Are there any questions about how you check the addresses and phone numbers?" (Pause)

"Now continue by looking up the information for each of these names. Continue on the other side of your sheet. Remember, do not mark anything in the Directory. Begin with these names now."

Record the starting time.

During the Administration, observe whether any examinee is marking in the Directory. Do not allow this. Any seriously marked up Directories must be discarded.

If any persons are not finished in 30 minutes, ask them to stop and you mark their paper, "DID NOT FINISH". Be sure to have all persons answer the experience questions. Collect all papers and phone directories.

Supplies needed for each examinee

1 Telephone Directory (North Suburban - Pittsburgh)

1 Comparing Telephone Information Worksheet

Directions for Administration

Copying Telephone Information

Distribute a Pittsburgh North Suburban Telephone Directory and a copy of "Copying Telephone Information" to each examinee. Then say, "At the top of this sheet, write in your name and identification number." (Pause)

"In this task, the job is to copy the addresses and telephone numbers exactly as they appear in the Telephone Directory. On the sheet is a list of names. Your task is to find each name in the Telephone Directory and to record the address and telephone number listed. The name in the Directory must match exactly the name on the list. After the address and telephone number have been found in the Directory, they should be written on the white sheet directly across from the name. Please remember do not write anything or make any marks in the Directory."

"To make sure you understand how to do this task we will work through two sample cases. Look at the first sample. The person's name is Wega Harold J. The last name is always presented first. Now open the Directory to the "W" listings and find the name Wega Harold J." (Pause - if anyone appears to be unable to locate the name say) "Wega Harold J is on page 196, in the upper part of the first column." (When everyone has found the name, say) "His address is 23 Ravine and this has been written on your Worksheet. The telephone number listed in the Directory for him is 781-4457. This is the number written in the column headed 'Telephone Number' directly across from the name Wega".

"Now look up the number for the second sample, Ziegler Albert. Write the address and number on your list." (Pause - if anyone appears to be having difficulty say) "Ziegler Albert appears on page 206, near the top of column two." When all have completed the item or after about 45 seconds say, "The address you should write in is 107 Ivy Rd West View. The number is 364-0769. It should be recorded across from Ziegler Albert in the column headed 'Telephone Number'." (Pause) Say, "Are there any questions?" (Answer questions)

"It is important that the addresses be copied exactly as given. Do not fill in abbreviations but copy them as printed."

"Now look up each of these names and copy the addresses and telephone numbers listed beside them in the Telephone Directory. Be sure to look up the name exactly as it is listed. Be sure to write as clearly as possible. Remember do not make any marks in the Directory. Begin with these names now."

Record starting time.

Collect the sheets and Directories when completed. During administration, observe whether any examinee is marking the Directory. Do not allow this. Any seriously marked up Directories must be discarded.

If any persons have not finished in 35 minutes, ask them to stop and you write "DID NOT FINISH" on their Worksheets. Be sure to have all persons answer the questions on experience. Collect the Telephone Directories and Worksheets.

Supplies needed for each examinee:

1 Telephone Directory (North Surburban - Pittsburgh)

1 Recording Telephone Information Worksheet

10/25 Name ____________

Identification Number ________

Worksheet

COPYING TELEPHONE INFORMATION

Name	Address	Telephone Number
Wega Harold J	23 Ravine	781-4457
Ziegler Albert		
Behr Richard W		
Bell Harry R		
Bender Alfred A		
Bennardo Frank A		
Starr Lawrence		
Staub Wilbert		
Stanek Jos E		
Sprague Wm A		
Phillips Leo J		
Piotrowski Edw		
Platts Jas R		
Platek Eugene		
Gonzales Edw		
Goston Edw		
Graham Robt G		
Grazioli J		
Mann M A		

CONTINUE ON OTHER SIDE

Name	Address	Telephone Number
Marcus Joan L		
Marker Earl		
Marriner Barry F		
Ritchey Jas E		
Roberts Edgar E		
Roche Jos		
Rogers Cyril C		
Kelley Chas E		
Kelsch Jos C		
Kerr Bruce		
Killen John S		
Diel Miriam		
Dille Guy		

Have you ever had a job on which you were paid for doing a task anything like this task?

☐ Yes ☐ No

for doing a task very much like this one?

☐ Yes ☐ No

Directions for Administration

Filing Appliance Dealers' Cards

Say to the examinee: "In this task, you are working with a company that buys appliances from many different suppliers. Your job is to keep a file containing the names of the suppliers. Some of these suppliers sell directly to the public, that is, to individuals like you and me, and are called, "retailers". Other suppliers will sell only to other companies and are called, "wholesalers". Both these suppliers specialize in selling one particular kind of home appliance; for example, stoves, or refrigerators, or washing machines or dryers."

Hand set of file cards to examinee and say, "Here is a set of cards that gives information about each supplier your company works with. Look at the first card. It gives the name of the supplier, "North Boro's Appliance". It says they sell Dryers - gas and electric. And in the lower right hand corner it says they are wholesalers, which means they sell only to other companies. Each one of the cards you have gives this kind of information for a supplier."

"Your task is to file these cards in a box." (Give examinee a file box for 3 x 5 cards, containing 10 divider cards, arranged in order as follows from front to back:

- Wholesalers
  - Stoves
  - Refrigerators
  - Washing Machines
  - Dryers
- Retailers
  - Stoves
  - Refrigerators
  - Washing Machines
  - Dryers

"Look at the file dividers that are in the box. There are two major sections in the file. The first divider is for Wholesalers. All suppliers who are wholesalers will be filed behind this card.

The second section of the file is for retailers. Do you see the divider marked, "Retailer"? (Pause while it is found.) All the cards for suppliers that are retailers will be filed behind this divider marked "Retailer".

Now look for a divider marked "DRYERS". You will find one for Wholesalers and another for Retailers. Suppliers who sell dryers will have their cards filed behind these dividers depending on whether the supplier is a wholesaler or a retailer.

Other suppliers sell washing machines and there are dividers behind which you will file their cards, depending on whether they should be in the wholesaler section or the retailer section. Other suppliers sell refrigerators or stoves and there are divider cards behind which their cards will be filed.

For a sample exercise, let's file the card for North Boro's Appliance, the card that is on the top of your set of cards. (Pause while it is located.) The card says that North Boro's Appliance is a wholesaler. So we know that the card should be filed in the front section of the file, somewhere behind the "Wholesaler" divider. But behind which appliance? (Pause). Look at North Boro's card to see what appliance it sells. It says it sells Dryers - gas and electric". Thus the card should be filed behind, not in front of, the divider for "Dryers" which is behind "Wholesaler". Now place it in your box in the correct section. (Pause).

"Do you have any questions?" (Answer any questions that may arise.)

"Now file the next card in your set. It is for the Morris Electric Supply Company. Put it in the right section. But do not file other cards yet." (Pause while this is done.)

"The card for the Morris Electric Supply Company goes in the back part of the box behind "Retailer" and behind the divider for "WASHERS" that is in the back part of the file. Be sure to put the card in that section. (Pause while this is done.) Are there any other questions." (Answer questions.)

"Now, listen carefully. After you have placed each of the cards in its proper place, you will have several cards behind each divider. Each of these sets of cards should then be placed in alphabetical order according to the name of the supplier. If the supplier's name begins with A, his card will go in front of the card for a supplier whose name begine with B or a letter later in the alphabet. If two suppliers in a set have names beginning with the same letter, decide their order by looking at the second letter of their names. Now remember. Arrange the cards in alphabetical order within each set. It will be easiest if you take one set of cards out of the box, put them in alphabetical order, and then place them behind their proper divider. Then do each of the other sets in this way. Are there any questions about alphabetizing the cards?" (Pause for questions.)

"All right. Your task is to file your set of cards in the box behind the proper divider. Do each card, one at a time. Read the card and file it in the proper section. Then be sure to put the cards within each section in alphabetical order. After you have finished alphabetizing the cards, raise your hand, and I will come to you to explain what you will need to do next. You may begin with your cards now.

Record the starting time. Repeat alphabetizing directions to individuals as needed.

As the examinees raise their hands, check to see if they have attempted to alphabetize the cards. Remind them to do this work if it has not been completed. Take them a copy of the Recording Sheet, have them write their name and number on it and answer the questions about experience. Collect file boxes, dividers and cards. Do not ask them to record the numbers.

If any person has not finished filing the cards in 25 minutes, ask the person to stop. Give these persons the Recording Sheet. Have them write their name and identification number on the sheet and answer the questions on experience. Then you should write "DID NOT FINISH" on these Recording Sheets. Collect all file boxes, dividers and cards.

During the administration of other task measures or after their administration, record the numbers on the upper right hand corner of the cards on the Recording Sheet as they have been arranged by the examinee. There are more lines than cards in each division. After the numbers have all been recorded, rearrange the cards for the next administration by placing them in numerical order from 1 to 58.

Supplies needed for each examinee:

1 File box containing the set of 58 cards for the task "Filing Appliance Dealers' Cards" (Box also used in "Comparing Addresses")
1 set of dividers (10)
1 sheet for recording numbers of cards in file order.

10/25

Name ______________________________ Identification Number __________

Filing Appliance Dealers Cards

Have you ever had a job on which you were paid
for doing a task anything like the filing which you did?
☐ Yes ☐ No
for doing a task very much like the filing which you did?
☐ Yes ☐ No

WHOLESALE	Stoves	Refrigerators	Washers	Dryers
	______	______	______	______
	______	______	______	______
	______	______	______	______
	______	______	______	______
	______	______	______	______
	______	______	______	______
	______	______	______	______
	______	______	______	______
	______	______	______	______
	______	______	______	______
RETAIL	______	______	______	______
	______	______	______	______
	______	______	______	______
	______	______	______	______
	______	______	______	______
	______	______	______	______
	______	______	______	______
	______	______	______	______
	______	______	______	______
	______	______	______	______

Directions for Administration

Summary of Applications

Distribute a set of Application forms to each person. There are 15 applications in each set. Also distribute one copy of the "Summary of Applications".

When completed, say, "Each of you has a set of fifteen completed application forms. You may look at them but please do not get them out of order. You have also been given a "Summary of Applications". At the top of this form write your name and identification number in the spaces provided. (Pause) When all have completed this, say, "Read the instructions at the top of the Worksheet to yourself while I read them aloud." (Read aloud:)

"In this task you will prepare a summary of information from a set of Application forms. The names of the applicants have been printed in the first column below. You are to record, in the spaces after each name, the information requested about each applicant. You will find the information you need for completing the summary on the Application forms. Most of the information is simply copied but some information must be coded. These codes are given at the bottom of this page." (End of instructions on the Summary.)

"Now let's see how the information is copied onto the Summary for the first applicant, for Lawrence E. Brown. The applicant's name has already been copied onto the Summary. The next column asks for the date of birth. Look at item 5 on the Application. (Pause) Mr. Brown's date of birth is July 12, 1942. The word, "July" is not copied but instead is coded by the table at the bottom of the page. Look there. (Pause) July is the seventh month. So 7 has been written under the column headed M-O for month. Next the day of birth has been written, 12. For the year of birth, only the last two numbers are used. For the 1942, only 42 has been written down. Are there any questions about copying the date of birth? (Pause)

The next column, C, is for recording whether the person is employed - letter E, or unemployed - letter U. Look at item 9 on Mr. Brown's application. It says he is "Not employed". So "U" has been written on the Summary. (Pause)

The next column, D, asks you to copy the social security number, which is shown in item 3 of the Application. Mr. Brown's number is 202-35-8891. Are there any questions about copying this number? (Pause)

The next column, E, is for recording the highest grade completed. The information comes from items six, seven, and eight on the Application form. In our example, Mr. Brown completed grade school and high school, but did not complete college. (Pause) "H-S" for high school is written on the Summary form. If he had completed grade school, but not high school or college, then G-S for grade school would have been written in. Or, if he had completed all three, including college or university, then C-O-L for college would have been written in Column E." This code is at the bottom of the Summary. (Pause)

"Marital Status is to be recorded in column F. This information comes from item 15 on the Application, and you can see that there are four choices: Single, Married, Divorced, or Widowed. Write in the letter S for Single, M for Married, D for Divorced or W for Widowed." (Pause) Ask, "Are there any questions?" (Answer questions)

"Column G asks for the zip code of the person's address. Mr. Brown's zip code, 88432, near the top of his application, has been copied correctly onto the Summary."

"Whether or not the individual is a citizen of the USA goes in Column H, and comes from item 14 on the application. Write in "Yes" if the applicant is a citizen, "No" if he is not." (Pause) "Are there any questions about copying or coding any information? (Pause and answer questions.)

"Now begin filling in the Summary form for the second application. Be sure and use the correct codes and write legibly and clearly. Work as quickly as you can but without making mistakes. Do not omit any information in the columns. When you have completed the Summary Sheet for all 15 application forms, raise your hand and I will pick up your material." Record the starting time. As persons finish, be sure to have them turn over the Summary and answer the questions about experience.

If any persons are not finished in 21 minutes working time, ask them to stop. Be sure to have them answer the experience questions and mark their papers, "Did not finish".

Supplies needed

For each examinee:

1 set of Applications (15 each)
1 Summary of Applications

Identification Number ____________

SUMMARY OF APPLICATIONS

Instructions

In this task you will prepare a summary of information from a set of APPLICATION forms. The names of the applicants have been printed in the first column below. You are to record, in the spaces after each name, the information requested about each applicant. You will find the information you need for completing the summary on the APPLICATION forms. Most of the information is simply copied but some information must be coded. These codes are given at the bottom of this page.

Column A Name	Column B Date of Birth Mo.	Day	Year	Column C Currently Employed? (E or U)	Column D Social Security Number	Column E Highest Grade Completed (GS, HS, COL)	Column F Marital Status (S,M,D,W)	Column G Zip Code	Column H American Citizen (Yes or No)
Brown, Lawrence E.	7	12	42	U	202358891	HS	M	88432	Yes
Burke, Walter D.									
Colson, Ellen D.									
Edwards, Ralph E.									
Felton, Marvin T.									
Graham, Donald T.									
Harris, Mabel P.									
Mikano, John J.									
Moreno, Rita E.									
Peterson, Elvin R.									
Sanchez, Theodore T.									
Scatz, William A.									
Spinolla, Mary A.									
Traco, Elizabeth M.									
Wilson, Annette B.									

Answer questions on the back

Date of Birth

Month

1 - January	5 - May	9 - September
2 - February	6 - June	10 - October
3 - March	7 - July	11 - November
4 - April	8 - August	12 - December

Year

Enter only last two digits. Write 42 for 1942, 27 for 1927, etc.

Currently Employed

E - Employed
U - Unemployed, Not Employed

Highest Grade Completed

GS - Grade School
HS - High School
COL - College or University

Marital Status

S - Single
M - Married
D - Divorced
W - Widowed

Have you ever had a job on which you were paid
for doing a task anything like this task?

☐ Yes ☐ No

for doing a task very much like this one?

☐ Yes ☐ No

APPLICATION FOR SERVICES

All applicants for the services provided by this department are required to complete this application form. Please complete all items. Do not leave any questions unanswered.

1. Name BROWN LAWRENCE E
Last First Middle Initial

2. Address 1439 Crescent St. Biloxi, Miss. 88432
Street Number Town State Zip Code

3. Social Security Number 202 - 35 - 8891

4. Sex ☒ Male ☐ Female (Check only one box)

5. Date of Birth July / 12 / 1942
Month Day Year

Education: *(Check whether you COMPLETED OR DID NOT COMPLETE each level of school in questions 6, 7, and 8)*

		Completed		Did not Complete	
6.	Grade School	☒	or	☐	*(Check only one box)*
7.	High School	☒	or	☐	*(Check only one box)*
8.	College or University	☐	or	☒	*(Check only one box)*

9. Currently I am: ☐ Employed ☒ Not Employed *(Check only one box)*

My last two jobs were: *(List current or most recently held job first)*

10. GULF PAPER CORP. 11. CARTON PACKER
Name of Company Job Description or Title

12. SOUTHERN MEAT PACKING 13. BUTCHER'S HELPER
Name of Company Job Description or Title

Citizenship:

14. I ☒ Am ☐ Am Not a citizen of the U.S.A. *(Check only one box)*

15. At this time I am ☐ Single ☐ Divorced ☒ Married ☐ Widowed *(Check only one box)*

Directions for Administration

DETERMINING HOUSING QUALIFICATIONS

Distribute to each person a copy of the "List of Housing Applicants." Each Listing is for a family, and contains a brief description of family size and family income. There are two listings for practice exercises and 23 listings for measuring task performance.

When distributed, say, "Each of you has a List of Housing Applicants containing the names and personal information about families who are applying for low rent housing. Each listing gives the name of a family on the first line. (Pause) Next there are sentences which give you the information about the size of the family -- that is, the number of persons in the family -- and the total monthly income of the family. You will use this information about family size and total monthly income to decide whether or not each family is qualified for low rent public housing. And, for those families that are qualified for this housing, you will also determine the size of the apartment for which they are qualified."

Now distribute the Worksheet headed "HOUSING QUALIFICATION WORKSHEET" and say, "Here is a Worksheet you will use to do this task. Write your name and identification number in the space provided at the top of the page." (Pause, and when completed, say) "Now, read the instructions at the top of the page to yourself while I read them aloud."

INSTRUCTIONS

(Read Aloud)

"Low rent public housing is available for individuals and families with low incomes. Monthly family income and the size of the family determine whether or not a family is qualified for this housing, and if qualified, the size of the apartment they may rent."

Look at the table below which gives the information you will need, to make decisions about each case.

Housing Qualifications Table

Number of Persons in Family	Maximum Monthly Income Allowed	Size Apartment for which Family is qualified
1	$400	Efficiency (Eff)
2	$500	1 Bedroom (1 BR)
3	$550	2 Bedrooms (2 BR)
4	$600	2 Bedrooms (2 BR)
5	$650	3 Bedrooms (3 BR)
6	$675	3 Bedrooms (3 BR)
7	$700	4 Bedrooms (4 BR)
8 or more	$725	4 Bedrooms (4 BR)

(Not an Official Table)

(Pause -- allow everyone to locate and look at the table for a moment.) Then say, "To make sure everyone knows how to use this table and to fill out the worksheet we will do two examples together. Look at the description of the first family listed. The name of the first family is ALVAREZ, Frederick E. (Pause) Read about his family to yourself while I read aloud. (Read Aloud)

> ALVAREZ, Frederick E.
>
> Mr. Alvarez is married and has two daughters, Emilia, age 8 and Frederica, age 4. He is employed as a carpenter's helper and earns $525 per month.

Say, "Now look at your Worksheet. At the middle of the page on the left hand side find the name ALVAREZ." (Pause -- make sure everyone finds the right place on the worksheet.) "Looking across the Worksheet you can see that there are four questions to be answered about each family -- the number of persons in the family, the total monthly family income, is the family qualified for low rent housing?, and the size apartment for which the family is qualified? In order to answer the first question you must look at the description of his family and decide how many persons are in the family. (Pause) There are four people in the Alvarez family, and you will notice that the number '4' has been written in on the worksheet next to the name Alvarez. (Pause) Does everyone understand how we determined that there are four people in the Alvarez family?" (Repeat the explanation above if there are questions.)

Say, "Mr. Alvarez is employed as a carpenter's helper and earns $525 per month. This has also been written in on the Worksheet, in the second space beside Alvarez's name." (Pause) "The next step is to decide whether or not the Alvarez family is qualified for low rent housing. To decide this we must use the table that is printed on the Worksheet." (Pause -- point out the table.) "Look down the left hand column for the number of persons in the family. Find the number '4'." (Pause) "In the middle column, the maximum monthly income allowed for a family of four is $600. This means that any family of four persons that has a total monthly income of $600 or less is qualified for low rent housing. Since the Alvarez family income is only $525, they are qualified for low rent housing. On the Worksheet an 'X' has been written before Yes. If the Alvarez family income had been more than $600, say $625, they would not qualify and No would have been checked. Are there any questions?" (Pause)

"Now, the final item on the Worksheet deals with the size of the apartment for which a family is qualified. It is the number of persons in a low income family which determines the size of the apartment they may have. The table says if there is just one person in a family, he or she may rent an efficiency apartment. Two-person families may rent a one bedroom apartment. If a family consists of either three or four persons they may have a two bedroom apartment, and so on. The largest apartments have four bedrooms, and to qualify for one of these, there must be at least seven people in the family."

"The Alvarez family consists of four people, and since their total income qualifies them for an apartment, they are qualified to rent a two bedroom apartment. On the Worksheet '2 BR' has been circled to indicate that they qualify for a two bedroom apartment. Are there any questions?" (Pause)

Say, "Let's do one more example. Look at the second listing, the one for the CHAVIN family." (Pause) Read aloud, "CHAVIN, William R. Mr. Chavin is single, but supports both parents who live with him. If qualified for public housing Mr. Chavin's parents will continue to live with him. His income is $400 a month as an apprentice tailor. With his father's pension of $175 a month, the total family income is $575 per month." (Pause) "On the Worksheet there has been written that there are three people in this family and the TOTAL family income is $575." (Pause) "The income for this family of three is more than the maximum of $550. Therefore they do not qualify for low rent housing and No has been checked on the Worksheet." (Pause) "If a family does not qualify for this housing, then they do not qualify for an apartment of any size and 'None' should be circled." (Pause) "Are there any questions before we go on?" (Answer questions and then say:) "Now fill in the worksheet for each family. Do all the items for one family before going on to the next one. Work right down the page and then do the items on the back. Work as quickly as you can without making mistakes. When you have completed all the items, put your pencil down and I will pick up your Worksheet. Write only on the Worksheet; do not write, or make any marks on the Listing." (Pause)

When everybody is ready, say,"Begin working now." Record the starting time.

As individuals finish, remind them to answer the question about experience. Monitor the session closely to make sure individuals do their own work. If any persons are not finished in 25 minutes working time, ask them to stop and mark their papers "Did not finish." Be sure, however, to have these persons answer the questions on experience. Collect all materials.

Supplies needed

For each examinee:

1 List of Housing Applicants
1 Housing Qualification Worksheet
    Front Side - Instructions, 2 examples, and items 3 - 12
    Back Side - Items 13 - 25

LIST OF HOUSING APPLICANTS

1. ALVAREZ, Frederick E. -- Mr. Alvarez is married and has two daughters: Emilia, age 8 and Frederica, age 4. He is employed as a Carpenter's helper and earns $525 per month.

2. CHAVIN, William R. -- Mr. Chavin is single, but supports both parents who live with him. If qualified for public housing Mr. Chavin's parents will continue to live with him. His income is $400 a month as an apprentice tailor. With his father's pension of $175 a month the total family income is $575 a month.

3. CLARKE, Helen E. -- Ms. Clarke is divorced, and has two daughters living with her. Her total monthly income, including child support from the children's father is $480. She is employed part-time as a waitress.

4. DORSEY, Reagin J. -- Mr. Dorsey is married and has two children: Reagin Jr., age 6 and Samantha, age 5. Mrs. Dorsey's mother also lives with the family. Mr. Dorsey works as a shoe repairman. The total monthly family income is $675.

5. ESSEN, Ellen E. -- Single, Ms. Essen lives alone and works as a clerk-typist, earning $395 a month.

6. FARR, John C. -- Widowed, Mr. Farr is retired and living on a monthly pension of $430.

7. GUNTHER, Allan B. -- Mr. and Mrs. Gunther have 5 children, ranging in age from 3 to 16. Mr. Gunther is employed as a welder, with a monthly salary of $650.

8. HALSTEAD, Elsa -- Ms. Halstead lives with her mother and her aunt. Each works and the total family income is $925.

9. INKSTER, Roland -- Mr. and Mrs. Inkster have no children. He is a disabled veteran and collects a disability pension of $250 a month. With Mrs. Inkster's salary as a part-time sales clerk the total monthly family income is $425.

10. JONES, Ernest P. -- In addition to his wife, Mr. Jones lives with and supports their four children and his parents. The monthly family income is $720.

11. KERMIT, Amil -- The Kermit family consists of Mr. and Mrs. Kermit and 4 sons aged 9 to 15. His monthly income is $695.

12. LANGLEY, Ruth -- Miss Langley and her sister live together. The total monthly income for this family is $480.

13. MONTAGUE, Robert T. -- Mr. and Mrs. Montague have three children living at home. The total monthly family income is $610.

14. NAPIER, Arnold -- Mr. and Mrs. Napier have six children ranging in age from 1 year to 15 years old. Mr. Napier is employed as a waiter, having a monthly income of $715.

15. OLSON, Glenn -- Mr. Olson is single. His monthly income is $495 as a parking lot attendant.

CONTINUE ON REVERSE SIDE

16. OSWALD, Mildred -- Mrs. Oswald, a widow, supports her two children on a monthly income of $450.

17. PARIS, Mildred -- Ms. Paris earns $475 as a clerk-typist. She supports herself and one daughter on this salary.

18. PRETT, John -- Mr. and Mrs. Prett have three children. Mrs. Prett earns $200 a month as a part-time hospital aide. Mr. Prett earns $400 a month as a sales clerk. The total family income is $600 a month.

19. RILEY, Alan -- Mr. Riley is married and they have one child. His monthly salary as a cook is $580.

20. RUDD, Martin -- The Rudd family consists of Mr. and Mrs. Rudd, both of Mr. Rudd's parents, and Mrs. Rudd's mother. The total family income of $700 comes from Mr. Rudd's monthly salary of $550 and his father's monthly pension of $150.

21. THOMAS, Henry -- Henry Thomas is married. The Thomas family's monthly income is $525, primarily from his job as a salesman.

22. TILLY, Virginia -- Virginia supports herself and two younger sisters. She works as a legal secretary and has a monthly salary of $515.

23. ULLAND, Hans -- Mr. Ulland is married. He and his wife have seven children living at home. His monthly salary as a salesman is $710.

24. WERNER, Edward -- The Werner family consists of Mr. and Mrs. Werner, and their two children. Working as a construction laborer, Mr. Werner's monthly salary is $580.

25. ZUNK, Guthrie -- Mr. Zunk is single and works as a shipping clerk. His monthly salary is $390.

HOUSING QUALIFICATION WORKSHEET

Name ______________________________ Identification Number __________

INSTRUCTIONS

Low rent public housing is available for individuals and families with low incomes. Monthly family income and the size of the family determine whether or not a family is qualified for this housing, and if qualified, the size of apartment they may rent.

The table below gives the information you will need to make decisions about each case.

Housing Qualifications Table

Number of Persons in Family	Maximum Monthly Income Allowed	Size Apartment for which Family is qualified
1	$400	Efficiency (Eff)
2	$500	1 Bedroom (1 BR)
3	$550	2 Bedrooms (2 BR)
4	$600	2 Bedrooms (2 BR)
5	$650	3 Bedrooms (3 BR)
6	$675	3 Bedrooms (3 BR)
7	$700	4 Bedrooms (4 BR)
8 or more	$725	4 Bedrooms (4 BR)

(Not an Official Table)

	Name	Number of Persons in Family	Total Monthly Family Income	Is this Family Qualified for Low Rent Housing?	For What Size Apartment Does the Family Qualify?
1.	ALVAREZ	4	$525	X Yes ___ No	Eff 1BR [✓ 2BR] 3BR 4BR None
2.	CHAVIN	3	$575	___ Yes X No	Eff 1BR 2BR 3BR 4BR [✓ None]
3.	CLARKE	____	$______	___ Yes ___ No	Eff 1BR 2BR 3BR 4BR None
4.	DORSEY	____	$______	___ yes ___ No	Eff 1BR 2BR 3BR 4BR None
5.	ESSEN	____	$______	___ Yes ___ No	Eff 1BR 2BR 3BR 4BR None
6.	FARR	____	$______	___ Yes ___ No	Eff 1BR 2BR 3BR 4BR None
7.	GUNTHER	____	$______	___ Yes ___ No	Eff 1BR 2BR 3BR 4BR None
8.	HALSTEAD	____	$______	___ Yes ___ No	Eff 1BR 2BR 3BR 4BR None
9.	INKSTER	____	$______	___ Yes ___ No	Eff 1BR 2BR 3BR 4BR None
0.	JONES	____	$______	___ Yes ___ No	Eff 1BR 2BR 3BR 4BR None
1.	KERMIT	____	$______	___ Yes ___ No	Eff 1BR 2BR 3BR 4BR None
2.	LANGLEY	____	$______	___ Yes ___ No	Eff 1BR 2BR 3BR 4BR None

(CONTINUE ON REVERSE SIDE)

Housing Qualifications Table

Number of Persons in Family	Maximum Monthly Income Allowed	Size Apartment for which Family is qualified
1	$400	Efficiency (Eff)
2	$500	1 Bedroom (1 BR)
3	$550	2 Bedrooms (2 BR)
4	$600	2 Bedrooms (2 BR)
5	$650	3 Bedrooms (3 BR)
6	$675	3 Bedrooms (3 BR)
7	$700	4 Bedrooms (4 BR)
8 or more	$725	4 Bedrooms (4 BR)

	Name	Number of Persons in Family	Total Monthly Family Income	Is this Family Qualified for Low Rent Housing?	For What Size Apartment Does the Family Qualify?
13.	MONTAGUE	____	$______	____ Yes ____ No	Eff 1BR 2BR 3BR 4BR None
14.	NAPIER	____	$______	____ Yes ____ No	Eff 1BR 2BR 3BR 4BR None
15.	OLSON	____	$______	____ Yes ____ No	Eff 1BR 2BR 3BR 4BR None
16.	OSWALD	____	$______	____ Yes ____ No	Eff 1BR 2BR 3BR 4BR None
17.	PARIS	____	$______	____ Yes ____ No	Eff 1BR 2BR 3BR 4BR None
18.	PRETT	____	$______	____ Yes ____ No	Eff 1BR 2BR 3BR 4BR None
19.	RILEY	____	$______	____ Yes ____ No	Eff 1BR 2BR 3BR 4BR None
20.	RUDD	____	$______	____ Yes ____ No	Eff 1BR 2BR 3BR 4BR None
21.	THOMAS	____	$______	____ Yes ____ No	Eff 1BR 2BR 3BR 4BR None
22.	TILLY	____	$______	____ Yes ____ No	Eff 1BR 2BR 3BR 4BR None
23.	ULLAND	____	$______	____ Yes ____ No	Eff 1BR 2BR 3BR 4BR None
24.	WERNER	____	$______	____ Yes ____ No	Eff 1BR 2BR 3BR 4BR None
25.	ZUNK	____	$______	____ Yes ____ No	Eff 1BR 2BR 3BR 4BR None

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Have you ever had a job on which you were paid for doing a task anything like this task?

☐ Yes ☐ No

for doing a task very much like this one?

☐ Yes ☐ No

10/17/74

Calculating Postage Charges

Directions for Administration

Distribute copies of "Calculating Postage Charges" and pieces of scratch paper. Say, "In this task the job is to calculate the postage charges. At the top of the page is given the postage rates. Note that it shows the kind of mail and the cost per ounce or per piece. It shows that for first class mail the cost is $ .10 per ounce; for single post cards it costs $ .08 each; for double post cards the cost is $ .16 each; for air mail letters it costs $ .13 for each ounce the letter weighs."

"It also shows the additional fees or cost for two extra services. Each letter or card sent by special delivery costs sixty cents extra. Each letter sent by certified mail costs thirty cents more."

"Below these rates is shown Monday's mail and how the cost was figured. Let us look at these examples. First there is the first class letter. Each piece weighs two ounces. The table at the top says that each ounce of a first class letter costs 10 cents. So a two ounce letter costs 20 cents. This has been written in the next column under "Cost per Piece".

"There are two first class letters of this kind, so 2 times 20 cents is 40 cents and this has been written in the column under "Cost".

"Now Monday's mail also included air mail letters weighing 3 ounces each. An air mail letter costs $ .13 per ounce, so 3 ounces would cost $ .39 and this has been written in the column headed "Cost per Piece". The next column says there is one such air mail letter so the total cost in the last column to the right is thirty nine cents."

"Now look at the next mail for Monday. There are double post cards. The ounces or weight is not important but our table at the top of the page shows that it costs $ .16 for each double post card. But in addition the cards have been sent by special delivery, which costs sixty cents each. So the total cost for a special delivery double post card is seventy-six cents. So 76 cents has been written in the column, "Cost per Piece". The number of double post cards is 10 so that the total cost in the right hand column is 10 times 76 cents or seven dollars and sixty cents. You can use the scratch paper for your calculations."

"The next part of the Monday's mail is single post cards. Again ounces are not important but the table at the top of the page shows that each single post card costs $ .08 each. But in addition the cards have been sent by certified mail, which costs thirty cents more. So the total cost for each certified single post card is thirty eight cents. For five such cards, five times thirty eight, is one dollar and ninety cents."

"That is all the mail for Monday so the column for "Costs" has been added. These numbers are 40 cents, 39 cents, seven dollars and sixty cents, and one dollar and ninety cents. Check this adding. (Pause while this addition is checked.) Yes, these numbers add to ten dollars and twenty nine cents."

"Are there any questions about how the postal charges for Monday's mail were calculated?" (Pause to allow questions to be raised and answered.)

"Now figure the costs for Tuesday's mail. Note that there are four different types of mail on Tuesday. For each one write in the cost per piece, and then the total cost for those pieces. Finally add the charges to show the total cost of Tuesday's mail, but do not go on to Wednesday's mail."

Allow about 5 minutes for the examinees to work on the calculation of the cost for Tuesday's mail and then say, "Now let's work through how you would calculate the cost of Tuesday's mail. First look at the air mail letter, each one weighing 2 ounces. Since it costs 13 cents for one ounce, 2 ounces would cost 26 cents each. There are three such air mail letters, each costing 26 cents, so that the total cost written in the right hand column should be 78 cents."

"The second part of Tuesday's mail is a one ounce first class letter, special delivery. This would cost 10 cents for the letter plus sixty cents for special delivery. So you should write in 70 cents in the third column. It says that eight such letters were mailed. Eight times 70 cents is five dollars and sixty cents; write this in the right hand column."

"The next mail is certified first class letters each weighing 4 ounces. The cost per piece is 40 cents plus 30 cents, a total of 70 cents. Write that in the column under "Cost per Piece". There are four such pieces so that the cost in the right hand column should be four times 70 cents or two dollars and eighty cents."

"The final mail for Tuesday was double post cards. The cost per piece is 16 cents each. Write 16 cents in the third column. There were two double post cards mailed on Tuesday. Two times 16 cents is 32 cents. Write this in the right hand column."

"Now add the four numbers in the right hand column. (Pause) The total of these numbers is nine dollars and fifty cents. Are there any questions how the cost for the mail for each day is calculated?" (Pause for any questions and answers.)

"Now begin to calculate Wednesday's mail and then Thursday's mail and when this is completed continue on the other side, calculating the mail costs for each of the other days shown on the other side. Begin now."

If any persons are not completed in 30 minutes, ask them to stop and you record "DID NOT FINISH" on their papers. Be sure that all persons answer the questions on experience. Collect all sheets and destroy the scratch paper.

Supplies needed

For each examinee:

- 1 Calculating Postage Charges Worksheet
    - Front Side - Postage Rates, 2 examples and 2 items
    - Back Side - 3 items
- 1 piece scratch paper

Name ______________________

Identification Number __________

WORKSHEET
USING ZIP CODES

Examples	City	Airline	Flight Number
	Bellwood (16617)	Braniff	521
	Bolivar	American	____

Flight Numbers

Airline	157--	159--	164--	166--	177--	179--	180--	188--
1. Allegheny	414	442	416	462	471	719	810	818
2. American	875	820	846	616	741	917	801	186
3. Braniff	517	571	641	521	174	197	186	168
4. Commuter	751	195	461	466	774	710	108	381
5. Delta	365	424	369	641	147	971	188	116
6. Eastern	175	157	146	168	614	791	681	881
7. Northwest	159	165	167	468	179	149	214	368
8. TWA	571	519	466	186	797	177	848	183

◄ Zip Code

Flight Numbers

STEPS

1. Look in the Directory for the zip code number for the city and remember the first three numbers.
2. Find in the Table the column headed by those three numbers.
3. Look down the column until you are across from the name of the airline serving that city.
4. Copy the flight number in that box onto the line across from the city.

City	Airline	Flight Number
Cherryville	Eastern	____
Coral	Allegheny	____
Cassville	Northwest	____
Dunlo	Commuter	____
Friedensburg	TWA	____
Harford	American	____
East Springfield	Braniff	____
Eagles Mere	Delta	____
Limeport	Allegheny	____
Home	Eastern	____
Loysburg	American	____
Lilly	Northwest	____
Middleport	Delta	____
Jackson	Eastern	____

continue on other side

Flight Numbers

Airline	157--	159--	164--	166--	177--	179--	180--	188--
1. Allegheny	414	442	416	462	471	719	810	818
2. American	875	820	846	616	741	917	801	186
3. Braniff	517	571	641	521	174	197	186	168
4. Commuter	751	195	461	466	774	710	108	381
5. Delta	365	424	369	641	147	971	188	116
6. Eastern	175	157	146	168	614	791	681	881
7. Northwest	159	165	167	468	179	149	214	368
8. TWA	571	519	466	186	797	177	848	183

◄ Zip Codes

Flight Numbers

City	Airline	Flight Number
Linesville	Commuter	____
Linden	American	____
Pennsburg	Commuter	____
Nicktown	Braniff	____
Morann	Commuter	____
Nanty Glo	Eastern	____
New Philadelphia	American	____
Rome	Allegheny	____
Saegertown	Eastern	____
Shunk	Northwest	____
Riegelsville	Delta	____
Northpoint	TWA	____
Riddlesburg	Eastern	____
Robinson	TWA	____
Sacramento	Braniff	____
Springville	Braniff	____
Venango	Northwest	____
Trout Run	Braniff	____
Sunneytown	TWA	____
Starford	Commuter	____
Westover	Allegheny	____

Have you ever had a job on which you were paid
for doing a task anything like this task?
Yes ☐ No ☐

for doing a task very much like
this one? Yes ☐ No ☐

Directions for Administration

Using Zip Codes

Distribute to each examinee a copy of the Pennsylvania Zip Code Directory and of the Zip Code Worksheet. Say, "In this task you are working in a mail room, helping to send the airmail out on the proper airline and flight number. You are given the name of a city and the Airline that carries mail to that city. Then, use the Table on your Worksheet to find the flight number. Let's do the first example: (pause) Bellwood City served by Braniff Airline. The example shows the zip code is 16617. The first three numbers are 166. So look in the table at the column headed, 166-dash-dash. (Pause) Does anyone not see that column heading - 166?"

After questions, say "Now look down the column until you are on the line for Braniff Airlines. (Pause) The number in the column across from Braniff is 521. It has been circled to help you. The flight number, 521, has been written on the Worksheet across from the city, Bellwood."

Now let's do the second example: Bolivar, served by American Airlines. The zip code is not given, so first you will have to find it in the Zip Code Directory you have been given. Find Bolivar in your Directory. It is on the first page of cities. (Pause for examinees to find the number.)

"The zip code for Bolivar is 15923. Now look in the Table in the column headed 159. (Pause) Look down this column until you are across from American. The flight number is 820. So write 820 on your Worksheet on the line for Bolivar." (Pause)

"Read the steps below the Table which review how you are to find the flight number for each city.

1. Look in the Directory for the zip code number for the city and remember the first three numbers.
2. Find in the Table the column headed by those three numbers.
3. Look down the column until you are across from the name of the airline serving that city.
4. Copy the flight number in that box onto the line across from the city.

"Are there any questions about this task?" (Pause and answer questions). Begin with the list of cities and continue on the reverse side. Do not put any marks on the Directories."

Record the starting time.

If any person has not finished in 40 minutes, ask the person to stop and you write "DID NOT FINISH" on their Worksheet. Be sure to have all persons answer the questions on experience. Collect the Zip Code Directories and Worksheets.

Directions for Administration

Personnel Report Information

Distribute to each examinee one copy of the "Information Worksheet" with the side up showing spaces for Name, and say, "As soon as you receive this paper, write your name and identification number on the front, but do not turn the page over until we all are ready for it.

Distribute copies of the "Personnel Report - Accounting Department", one form to each examinee. Then say, "In this task you are working in a Personnel Office which has records about each employee. You have been given a copy of the personnel report prepared for the Accounting Department. Look at the headings across the top. Note that it shows (slowly) the name of the employee, the payroll number, the job title, the age, the annual salary, the sex - M for Male and F for Female, and the number of months of service - the length of time the employee has worked in the company. This information is given for every employee in the Accounting Department."

"Look at the first line of the report. It says that (slowly) Eleanor Cain, (Pause) has payroll number 18642, has a job title of Accounting Clerk, is 22 years old, earning a salary of $6,080. The F shows she is a female, and she has 11 months of service with the company."

"Assume that as part of your work, various people call you on the phone and ask you questions about the Accounting Department. To answer the questions you need to look in this Personnel Report. Some examples are shown on the page with your name. Look at the examples at the bottom of the page. Example 1 asks: What is Mr. Hall's first name? Look on the Personnel Report under the column headed Name. The first name is Eleanor Cain. The next name is Leroy Campbell. Next is Gordon Hall. Mr. Hall's first name is "Gordon". To answer the question, write "Gordon" in the space for Example 1." (Show where it is located.)

"Look at the second example: How many stenographers are in the Accounting Department? Look in the column headed "Job Title" until you come to the job title, Stenographer. We see there are four persons in the position of Stenographer. So, write the number, "4" on the line for Example 2." (Show where it is located.)

"On the back of this page is a list of some of the questions you might receive. Read each question very carefully. Find the answer in the Personnel Report, and then write the answer beside the question. For some of the questions, you will need to do some arithmetic. You may use the margins or the other side of the page to perform this arithmetic. Be sure to put your answers in the spaces provided. All the information you need is in the questions or in the Personnel Report. Are there any questions? (Pause and answer questions.) Turn over the page, and begin to answer the questions." (Record the starting time.)

As examinees complete their work, remind them to complete the experience questions. If any persons are not finished in 25 minutes working time, ask them to stop and you mark their papers "Did not finish". Be sure, however, to obtain their answers to the experience question at the bottom. Collect all Information Worksheets and Personnel Reports.

Supplies needed

For each examinee:

- 1 Personnel Report - Accounting Department
- 1 Information Worksheet
    - Front Side - Identification and examples
    - Back Side - Questions and answer column

10/74

PERSONNEL REPORT - ACCOUNTING DEPARTMENT

Report for Month of September 1974

NAME	PAYROLL NUMBER	JOB TITLE	AGE	ANNUAL SALARY	SEX	MONTHS OF SERVICE
Eleanor Cain	18642	Accounting Clerk	22	$6,080	F	11
Leroy Campbell	33072	Accounting Clerk	41	$6,360	M	10
Gordon Hall	27001	Accounting Clerk	24	$6,360	M	12
Thelma Hayes	27924	Accounting Clerk	24	$6,260	F	19
Jerome Kirk	31624	Accounting Clerk	20	$6,100	F	7
Elaine Lazeroni	25429	Accounting Clerk	19	$5,960	F	8
Lynn Curtis	24910	Typist	22	$6,620	F	14
Paul Esposito	23727	Typist	23	$6,500	M	21
John Fontanoza	16411	Typist	26	$6,740	M	33
Beatrice Goode	20683	Typist	22	$6,260	F	14
Cora Johnson	10442	Typist	21	$6,440	F	16
Maxine Martin	10076	Typist	34	$6,280	F	27
Barbara Mason	34109	Typist	37	$7,000	F	46
Salley Miller	10337	Typist	26	$6,530	F	22
Judith Spellman	22813	Typist	32	$6,620	F	40
Phyllis Wilson	21609	Typist	29	$6,590	F	37
Fabiola Aguirre	35353	Stenographer	26	$6,720	M	37
Gladys Brown	42110	Stenographer	26	$6,600	F	38
Mary Lou Holloway	16644	Stenographer	34	$6,600	F	38
Linda Robinson	30031	Stenographer	28	$6,440	F	5
Lillian Jones	21108	Payroll Clerk	28	$6,440	F	18
Rodolfo Alverez	19614	Accountant	51	$7,600	M	4
Lynetta Sue Banks	26400	Accountant	30	$7,300	F	34
Robi Cecchettini	21709	Accountant	36	$6,800	M	9
Dorothy Green	30426	Accountant	24	$6,740	F	28
Charles Hayes	19798	Accountant	27	$7,600	M	49
Ricardo Muratorio	21629	Accountant	30	$7,400	M	62
Thomas Sullivan	27381	Accountant	29	$7,000	M	1
Angelo Alonzo	37883	Accounting Supervisor	29	$7,640	M	14
Marvin Baker	17009	Accounting Supervisor	28	$7,620	M	42
Aureo Belasco	35620	Accounting Supervisor	38	$8,200	M	58

Information Worksheet

Name: ______________________________

Identification Number: ____________________

EXAMPLES

Example 1. What is Mr. Hall's first name? 1. __________

Example 2. How many stenographers are in the Accounting Department? 2. __________

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LOCATING INFORMATION

1. How many men in the Department are over 45 years old? 1. ____________

2. How many men are in the whole Accounting Department? 2. ____________

3. How many persons have been in the Department more than two years? 3. ____________

4. What is the total months of service for all the Stenographers in the Department? 4. ____________

5. How many employees have been in the service more than 18 months and earn less than $6,500? 5. ____________

6. Thelma Hayes, Accounting Clerk, and Charles Hayes, Accountant, are married. How much do they earn each year together? 6. ____________

7. What is the average annual pay of the Accounting Supervisors? 7. ____________

8. What is the monthly pay of the Stenographer Fabiola Aquirre? 8. ____________

9. What is the average age of the Accounting Clerks? 9. ____________

10. How many men earn more than $600 per month as Accountants? 10. ____________

11. How many male Stenographers are more than 30 years old? 11. ____________

12. How many male Accountants earn more than the highest-paid female Accountant? 12. ____________

13. What is the difference in annual salary between the highest-paid and the lowest-paid Typist? 13. ____________

14. What is the average months of service of female Stenographers? 14. ____________

15. What is the total months of service of all male Accountants? 15. ____________

Have you ever had a job on which you were paid for doing a task anything like this task?

☐ Yes ☐ No

for doing a task very much like this one?

☐ Yes ☐ No

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CALCULATING POSTAGE CHARGES

Name ______________________ Identification Number ________

POSTAGE RATES

Kind of mail	Cost per ounce or per piece
first class letter	$ .10 per ounce
single post card	$ .08 each
double post card	$ .16 each
air mail letter	$ .13 per ounce

Additional fees	
special delivery (spec del)	60¢
certified mail (cert)	30¢

Kind of mail	Weight per piece	Cost per piece	Number of pieces	Cost
MONDAY'S MAIL				
first class letter	2 ounces	$ .20	2	$ .40
air mail letter	3 ounces	$ .39	1	$ .39
double post card(spec del)	---	$ .76	10	$ 7.60
single post card(cert)	---	$ .38	5	$ 1.90
		Total cost of Monday's mail =		$ 10.29
TUESDAY'S MAIL				
air mail letter	2 ounces	$.	3	$.
first class letter (spec del)	1 ounce	$.	8	$.
first class letter (cert)	4 ounces	$.	4	$.
double post card	---	$.	2	$.
		Total cost of Tuesday's mail =		$.
WEDNESDAY'S MAIL				
air mail (cert)	2 ounces	$.	6	$.
air mail letter	1 ounce	$.	4	$.
first class letter	3 ounces	$.	2	$.
single post card	---	$.	10	$.
first class letter (spec del)	2 ounces	$.	3	$.
		Total cost of Wednesday's mail=		$.
THURSDAY'S MAIL				
first class letter (cert)	4 ounces	$.	7	$.
double post card	---	$.	15	$.
first class letter	1 ounce	$.	8	$.
air mail letter	4 ounces	$.	6	$.
air mail letter (spec del)	3 ounces	$.	4	$.
		Total cost of Thursday's mail =		$.

CONTINUE ON THE OTHER SIDE

RATES

first class letter	$ .10 per ounce	double post card	$ .16 each	spec del	$ .60
single post card	$ .08 each	air mail letter	$ .13 per ounce	cert mail	$ .30

Kind of mail	Weight per piece	Cost per piece	Number of pieces	Cost
FRIDAY'S MAIL				
air mail letter (spec del)	2 ounces	$___.___	2	$___.___
double post card	---	$___.___	13	$___.___
first class letter	3 ounces	$___.___	24	$___.___
air mail letter	5 ounces	$___.___	11	$___.___
first class letter (cert)	2 ounces	$___.___	3	$___.___
first class letter	3 ounces	$___.___	13	$___.___
		Total cost of Friday's mail	=	$___.___
MONDAY'S MAIL				
first class letter (spec del)	4 ounces	$___.___	4	$___.___
single post card	---	$___.___	19	$___.___
air mail letter	3 ounces	$___.___	18	$___.___
first class letter (cert)	2 ounces	$___.___	7	$___.___
air mail letter	1 ounce	$___.___	14	$___.___
air mail letter	5 ounces	$___.___	17	$___.___
		Total cost of Monday's mail	=	$___.___
TUESDAY'S MAIL				
double post card	---	$___.___	11	$___.___
air mail letter	5 ounces	$___.___	7	$___.___
first class letter	3 ounces	$___.___	9	$___.___
air mail letter (spec)	1 ounce	$___.___	6	$___.___
air mail letter	2 ounces	$___.___	15	$___.___
double post card (spec del)	---	$___.___	9	$___.___
		Total cost of Tuesday's mail	=	$___.___

Have you ever had a job on which you were paid for doing a task anything like this task?

☐ Yes ☐ No

for doing a task very much like this one?

☐ Yes ☐ No

SPECIAL SCORING INSTRUCTIONS FOR CPM'S

The following instructions were provided to scorers and checkers for the CPM's:

Checking Applications

1. Put a line through each number that is not circled as required. Also, put a line through any number that is circled but should not be circled.
2. A common error that the examinees make occurs on the back side at the top. They incorrectly record on the top line the 12 and 13 that are the answers for the second item. This would appear to be 4 errors, according to the scoring system. However, count it only as two errors.

Comparing Addresses

1. If both S and D are checked for one item, the answer is incorrect.

Comparing Telephone Information

1. If both S and D are checked for the same item, the answer is incorrect.

Copying Telephone Information

1. If 3 or 4 of the last four digits of the telephone number are wrong, count it as 7 errors. The examinee has probably copied the wrong line, and may have gotten the exchange numbers (the first 3 digits) and possibly 1 of the last 4 digits correct by accident.
2. If the wrong street has been copied, the number of errors is the number of characters (digits and letters) in the correct address (not the number of characters in the wrong street that has been inserted).
3. Initial Caps in the address must appear as initial caps, and not as small letters. However, remember that people write differently. For example, either Greenhill, Greenhill, Greenhill, or Greenhill would be correct.
4. Either extra characters or missing characters in the address are incorrect.
5. Spacing of the address doesn't matter.

Classifying Appliance Dealers

1. Count the number of cards missing from each classification. Also write in the numbers of the cards missing at the bottom of the column. This will make the card number easier to find when you are scoring alphabetizing.
2. Circle, but do not count as incorrect, any extra numbers in the category.
3. If one card is completely missing, do not count it as an error. (This is probably the test administrator's recording error). However, if the cards missing are high numbers, e.g., 58, 57 and 58, or 56, 57 and 58, count these cards as "not attempted", and subtract these cards not attempted from 58.

Alphabetizing Appliance Dealers

1. If it's obvious there was no attempt to alphabetize, post 00 for the score and for the number attempted on the BDS.
2. After classification scoring has been completed, treat all card numbers as in correct classification. You will have to find the first letters of the card numbers you have circled using the special alphabetizing key. Then check to see if they were filed in correct alphabetical order within the category.
3. If all classification in a category is correct, there is no need to use the special alphabetizing key. Just mark with an arrow how the alphabetizing errors can be corrected.
4. Post classification errors on the left side of each category column. Post alphabetizing errors on the right side of each category column.
5. The total possible number of errors in any one of the 8 categories is 3.

   Score 1 error, if only one card number needs to be moved to have correct order.

   Score 2 errors if 2 card numbers have to be moved to have correct order.

   Score 3 errors if more than 2 card numbers have to be moved to have correct order.

6. The total possible number of alphabetizing errors is equal to 24 (3 errors in each category). Subtract the total errors from 58 or from the number attempted to obtain the alphabetizing score.

The scoring of the alphabetization task proved to be particularly difficult. First administrators were asked to record the order of the cards filed. They made some errors in this recording that could be identified, e.g. omission of cards. Others may have occurred. Despite instructions, some of the sample recorded the order of cards which they had filed. If these persons made copying errors (not known to the scorers), their score was improperly reduced. In addition the counting of errors beyond one or two cards out of order becomes very complex. For this reason scorers were directed not to try to untangle the web of errors beyond three. In future administration it is suggested that some other method of constructing task output be utilized that would permit simpler scoring.

Coding Application Data

1. If year appears as 1950, 1939, etc. rather than 50, 39, etc. do not score it as incorrect.
2. Code for HS, GS, and COL must be correct. That is, COL may not be written as College. Double or triple answers, as GS, HS, or GS, HS, COL, are not correct.
3. If only M & F appear in the Marital Status column, all items in the column are incorrect. This indicates the examinee has coded for sex, rather than marital status.

Copying Housing Qualifications

Score on Copying is the number right in columns headed "Number of Persons in Family" and "Total Monthly Family Income."

Classifying Housing Qualifications

Score on Classifying is the number right on the two subsequent columns to the right. Deviations from the key were permitted as follows:

- If the data copied in the first two columns are incorrect, the answers in the subsequent columns are evaluated in terms of using the wrong data rather than the scoring key. Thus a copying error does not affect the classifying score.

- If the worker incorrectly records that the given family is not qualified for low rent housing, in the subsequent column only the answer "None" is counted correct.

Locating and Classifying Zip Codes

If the examinee gets off the correct line, by omitting one number, (the answers are correct when you move the key up or down one line) do not count these answers incorrect. Just count one error.

Locating Personnel Information

Do not count it incorrect if a dollar sign has been omitted. Count as correct if either the word or number is given, e.g. 2 or two.

Calculating Postage Charges

1. If there is an error in the cost per piece, then check the multiplication and the addition in the next column, by doing them yourself. If the calculations are correct, treat them as correct even though the answers do not agree with the key.
2. If there is no error in the cost per piece; then score the multiplication only according to the scoring key.
3. If there is a multiplication error, check the addition by doing it yourself. If correct, treat the answer as correct even though it does not agree with the scoring key.

4. If the answer for cost per piece is .08, count .8, .-8, and 8 as correct. However do not count .80 or 8.00 as correct. This means that as long as there is no zero after the 8, the answer is correct.

5. If the cost per piece is missing, but the multiplication is correct, do not mark the cost per piece as an error.

6. If the decimal is not exactly in the proper place in the "cost per piece" column, do not count this as an error. However, the decimal must be correct in the multiplication and the addition columns.

7. Check to see if numbers in the "number of pieces" column have been changed from those on the "Cost" scoring keys. If they have, the key will be incorrect and you will have to do the multiplying to determine if the answer is correct.

BACKGROUND INFORMATION

NAME ____

Identification Number ________________________________

Which group best describes you? Check (X) one.

☐ 1. Negro

☐ 2. American Indian

☐ 3. White (Caucasian)

☐ 4. Spanish-speaking (Cuban, Mexican, Puerto-Rican, etc.)

☐ 5. Oriental

☐ 6. Other (specify ____________________________)

Sex

☐ Male

☐ Female

Birthdate ____ ____

Month Year

Education What is the highest school grade you completed? Check (X) one.

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10

☐ 11

☐ 12

☐ more than 12

BOLT	St. Sc.	GED
AR		
AC		
RC		
RV		

MPM	Raw Score	Experience		
		No No	Yes No	Yes Yes
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				